A REVIEW OF THE MOUNTAIN EAST WEST AND NORTH SOUTH TRANSPORTATION CORRIDOR ENVIRONMENTAL ASSESSMENT SUBMISSION

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EXECUTIVE SUMMARY

A. INTRODUCTION

In September of 1979, the Regional Municipality of Hamilton-Wentworth's elected Council voted in favour of constructing the proposed Mountain East-West and North-South Transportation Corridor.

The concept of an expanded roadway system which would connect Highway 403 in the Town of Ancaster to the Queen Elizabeth Way in the east end of the City of Hamilton was an issue which had been debated for decades in this Region. The debate continues today as the proposed project awaits a final decision from a Joint Board formed under the Consolidated Hearings Act. The hearings, that are scheduled to take place in mid-October 1984, will decide the final outcome of the project.

The purpose of the proposal, according to the Region:

> "...is a direct response to current local transportation issues expressed by the public, adopted policy of Regional Council, and the forecast of population and employment growth within the 20 year planning period to 2001."

B. REVIEW OF THE 'ENVIRONMENTAL ASSESSMENT SUBMISSION'

A review of the Region's rationale for the undertaking, as expressed in its Environmental Assessment Submission, indicated a number of issues and concerns related to the following:

1) the methodology used by the Region in developing the 'Preferred Alternative';
2) the use of population and housing projections to assess the need for the project; and,
3) the implementation of a public participation program.

C. ISSUES AND CONCERNS

The Region used a 'process of elimination' approach to assess which of 15 alternatives would be recommended for construction. Methodological concerns related to this process are as follows:

1) Use of Revised Regional Population Projections:

   a) The need for the expressway, as outlined in the 1982 Environmental Assessment Submission, is based upon 1981 Regional population projections which assume that the expressway will be built. Furthermore, no alternative scenarios (based on other population projections) were developed by the Region.

   b) It appears that, when the revised population projections were utilized to re-assess the need for the expressway, only the 'Preferred Alternative' (No.2) was studied. A downward revision in population could very well have meant that other previously eliminated alternatives would have become viable upon re-examination.

2) Use of Criteria in Evaluation Process:

   a) Opinions expressed by individuals, and used to measure criteria in the evaluation, should have been supported by hard information in certain cases.

   b) It is impossible to determine which evaluation criteria are considered important, and, thus,

weighted heavily by the Study Team. No overall assessment of alternatives is provided which would clearly indicate the 'Preferred Alternative'.

c) Confusion exists around the shifting use of criteria since the methodology:
   - uses different sets of criteria;
   - deletes criteria;
   - re-introduces criteria; and
   - adds new criteria.

   The use of criteria is inconsistently applied throughout the evaluation process.

d) Criteria which would have shown 'severe' negative impacts were deleted from the final stages of evaluation. The negative impacts associated with the 'Preferred Alternative' are not clearly stated or identifiable.

3) Use of Alternatives in Evaluation Process:

a) The selection of the 'Preferred Alternative' shifted during the evaluation from selecting the 'most appropriate' route to selecting the 'least disruptive' route. This guaranteed the selection of the least-worst alternative and not the best alternative - if one could be found.

b) The evaluation of alternatives was inconsistently applied since the process changed from evaluating entire routes to evaluating sections of routes during the study.

4) Use of Subjective Judgements in Evaluation Process:

a) The Study Team made a number of judgements about criteria which could/should have been better supported with the use of statistics and data.

A review of the Region's population and housing projections indicated that:

1) the population projection ('Most Likely') appears to be internally consistent; and,

2) sufficient justification for assuming a large population loss from the east-central lower City to the Mountain Urban Area is not adequately presented.

Concerns related to the public participation program, undertaken by the Region, are that:

1) it is not clear how the Study Team used public input in their decision-making process (particularly since the public ranked the 'Preferred Alternative' as its fifth of six choices);

2) the public only ever saw 6 of 15 alternative routes - all of which went through at least part of the Red Hill Creek Valley.

D. CONCLUSIONS

As a result of this examination of the Region's Environmental Assessment Submission, it is concluded that:

1) The process of evaluation, used by the Region for determining the 'Preferred Alternative', has methodological weaknesses and flaws.

2) The public participation program implemented by the Region presented a limited number of options to the public in a fashion which did not fully facilitate their involvement.

3) While the Region's population projections appear to be statistically consistent overall, unexplained questions remain about the logic and validity of some of the assumed internal population shifts.

4) If one accepts the notion of a direct link between the soundness of a methodology and the soundness of a resulting recommendation, then it can be concluded that the validity of the Region's 'Preferred Alternative' is challengable in view of the methodological weaknesses inherent in the evaluation process.

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A. INTRODUCTION

In September of 1979, the Regional Municipality of Hamilton-Wentworth's elected Council voted in favour of constructing the proposed Mountain East-West and North-South Transportation Corridor.

The concept of an expanded roadway system which would connect Highway 403 in the Town of Ancaster to the Queen Elizabeth Way in the east end of the City of Hamilton was an issue which had been debated for decades in this Region. The debate continues today as the proposed project awaits a final decision from a Joint Board formed under the Consolidated Hearings Act. The hearings, that are scheduled to take place in mid-October 1984, will decide the final outcome of the project.

Naturally, a proposal of such magnitude can be expected to have a number of community impacts. It was within this context that the Council's Board of Directors instructed staff to undertake a critical review of the Region's Mountain East-West and North-South Transportation Corridor: Environmental Assessment Submission (1982).[1]

The following report presents the findings of the Research Unit's examination of the Environmental Assessment Submission. The report is structured to contain five parts:

1. A brief overview of the background information related to the proposed expressway;
2. An outline of the methodology used in the 'Environmental Assessment Submission' and the issues and concerns related to that methodology;
3. A review of the public participation program with an emphasis upon the process used by the Region to solicit public input;
4. A review of the population and housing projections used by the Region to determine the need for the project and their implications; and
5. A statement of conclusions derived from an examination of the 'Environmental Assessment Submission'.

B. BACKGROUND

1. HISTORY OF THE UNDERTAKING

The following history of the proposed expressway has, largely, been extracted from the Government of Ontario's Review Under the Environmental Assessment Act[2] as reported in the Mountain East-West and North-South Transportation Corridor Environmental Assessment Submission by the Region. The review reads as follows:

> The expansion of the roadway system east-west across the Mountain area and north-south across the Escarpment in the east end of Hamilton, has been in the planning stage for several years. Past investigations include:
>
> - a roadway planning report prepared by Parsons, Brinkerhoff, Hall and McDonald in 1957;
> - the Hamilton Area Transportation Plan completed in 1963;
> - the Hamilton Transportation Strategy Study completed jointly by the City of Hamilton and the IBI Group in 1973; and
> - the Red Hill Creek Expressway Review completed in 1975 by the MTC.
>
> In 1968, the east-west Mountain Freeway was incorporated into the Official Plan of the City as a principal feature of the road pattern and neighbourhood structure. During the early 1970's, the Ministry of Transportation and Communications and the City of Hamilton participated in the funding of property acquisitions within the designated corridor, 60 m in width, located immediately south of existing Limeridge Road.

In 1975, the transportation analysis carried out as part of the Official Regional Plan preparation indicated major road expansion in selected areas to support the growth strategy adopted in the Official Plan. Included in the proposed roadway facilities was a new roadway link connecting Highway 403 in Ancaster to the Queen Elizabeth Way in the eastern portions in the City of Hamilton. The Regional Official Plan was approved by the Minister of Housing, June 26, 1980.

A detailed investigation of transportation needs in the Region was begun in February, 1978, and was carried out in three phases:

Phase 1 - Future Road Needs and Data Collection, July, 1978.

Phase 2 - Preliminary Evaluation of Alternatives, January, 1979.

Phase 3 - Detailed Impact Assessment and Evaluation, August, 1979.

A summary report of all these phases was also prepared. Regional Council adopted the recommendations in these studies and authorized the following studies to be undertaken:

- the preparation of a functional planning report for the selected alternatives;
- development of a conceptual recreation master plan for the Red Hill Creek Valley compatible with the proposed roadway facility; and
- preparation of a submission to the Ministry of Environment in accordance with the requirements of the Environmental Assessment Act.

On August 15, 1980, a regulation was filed that brought this undertaking under the Environmental Assessment Act. During the fall of 1981, revised population projections were prepared by the Region and incorporated into the Environmental Assessment Submission.

The environmental assessment was formally submitted to the Minister of the Environment in January, 1983. Notice was given to the Hearings' Registrar by the proponent requesting a hearing on the matter by the Joint Board under the Consolidated Hearings Act. The full Joint Board hearing is scheduled to begin 15 October 1984.

2. NATURE OF THE UNDERTAKING

The following describes the location of the proposed expressway as reported in the Government of Ontario review:

> The proposed facility connects Highway 403 in Ancaster to the Queen Elizabeth Way in the eastern portion of the City of Hamilton. The roadway link is made up of two integrated facilities with a controlled access roadway in the north-south direction and a limited access arterial in the east-west direction.
>
> A freeway is proposed to extend from the Queen Elizabeth Way at a new interchange and remain within and follow the Red Hill Creek Valley south to a point just north of Greenhill Avenue. At this point, the roadway ascends from the Valley following the general alignment of existing Mount Albion Road to connect with the east-west roadway in the vicinity of Mud Street and Pritchard Road. Throughout the north-south segment, access would be controlled through

interchanges at Barton Street, Queenston Road, King Street, Greenhill Avenue, Mud Street and Dartnall Road. All other road and rail crossings would be grade separated.

In the east-west direction, an at-grade arterial roadway extends from the Mud Street interchange through to the existing Mohawk Road interchange at Highway 403. The east-west facility generally follows the 60 m vacant corridor positioned immediately south of existing Limeridge Road.

It is intended that property adjacent to the east-west alignment will be protected to allow eventual upgrading of the east-west arterial roadway to a future freeway.[3]

Maps showing the geographical locations of the 15 major alternatives evaluated in the Region's Environmental Assessment Submission are presented in Appendix A. Alternative No. 2 was ultimately chosen by the Region as the 'Preferred Alternative' and recommended for construction.

The Region, in choosing Alternative No. 2, has stated that:

> "The purpose of the undertaking is a direct response to current local transportation issues expressed by the public, adopted policy of Regional Council, and the forecast of population and employment growth within the 20 year planning period to 2001."[4]

C. METHODOLOGICAL ISSUES AND CONCERNS

A review of the Region's Environmental Assessment Submission has identified a number of methodological concerns which should be discussed and questioned. This part of the review will highlight some of the methodological concerns which the evaluation process did not adequately consider.

1. OVERVIEW OF THE PROCESS OF EVALUATION

The Region, from the outset of its process of deciding upon a 'Preferred Alternative', stated that:

> "The foundation for the evaluation was derived from the three basic principles of decision-making:
>
> - decisions are based on the differences between available options;
> - monetary consequences must be separated from non-monetary impacts such that the cost of achieving a group of intangible benefits and/or disbenefits can be clearly identified; and
> - the impact assessment must deal directly with the issues relevant to the project. An understanding of these issues was derived from the public comments received.
>
> Essentially, the evaluation was a process of elimination to allow the major effort to be focused on a limited number of viable, feasible alternatives."[5]

It is upon these principles that the Region proceeded to evaluate alternatives. An overview of the evaluation process is illustrated in Figure 1.

FIGURE 1: OVERVIEW OF THE EVALUATION PROCESS

PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	RECOMMENDED
A. No-Action Planning Alternative					
B. Minor Planning Alternative					
C. Major Planning Alternative	Alternative No. 1				
	Alternative No. 2	Alternative No. 2	Alternative No. 2	Alternative No. 2	Alternative No. 2
	Alternative No. 3	Alternative No. 3	Alternative No. 3		
	Alternative No. 4	Alternative No. 4			
	Alternative No. 5				
	Alternative No. 6				
	Alternative No. 7				
	Alternative No. 8				
	Alternative No. 9				
	Alternative No.10	Alternative No.10	Alternative No.10	Alternative No.10	
	Alternative No.11	Alternative No.11	Alternative No.11		
	Alternative No.12				
	Alternative No.13				
	Alternative No.14				
	Alternative No.15	Alternative No.15			

Briefly, the Region conducted a five phase evaluating process which gradually eliminated the alternative routes presented in Appendix A. Three planning strategies were first identified - 'No Action', 'Minor' and the 'Major' planning alternatives (Phase 1). After selecting the 'Major' planning alternative, the Region developed 15 possible routes for achieving this alternative (Phase 2). Throughout Phases 3 to 5, alternatives were gradually eliminated until Alternative No. 2 was finally recommended as the 'Preferred Alternative'.

2. SUMMARY OF ISSUES AND CONCERNS

The following summarizes the methodological issues which are of concern:

a) Use of Revised Regional Population Projections

i) The need for the expressway, as outlined in the 1982 Environmental Assessment Submission, is based upon 1981 Regional population projections which assume that the expressway will be built. Furthermore, no alternative scenarios (based on other population projections) were developed by the Region.

ii) It appears that, when the revised (1981) population projections were utilized to reassess the need for the expressway, only the 'Preferred Alternative' (No. 2) was studied. A downward revision in population could very well have meant that other previously eliminated alternatives would have become viable upon re-examination. It is also conceivable that other options (e.g. the 'Minor' alternative) could have, as well, been proven viable.

b) Use of Criteria in Evaluation Process

i) Opinions expressed by individuals, and used to measure criteria in the evaluation, should have been supported by hard information in certain cases.

ii) It is impossible to determine which evaluation criteria are considered important, and, thus, weighted heavily by the Study Team. No overall assessment of alternatives is provided which would clearly indicate the 'Preferred Alternative'.

iii) Confusion exists around the shifting use of criteria since the methodology:

- uses different sets of criteria;
- deletes criteria;
- re-introduces criteria; and
- adds new criteria.

The use of criteria is inconsistently applied throughout the evaluation process.

iv) Criteria which would have shown 'severe' negative impacts were deleted from the final stages of evaluation. The negative impacts associated with the 'Preferred Alternative' are not clearly stated or identifiable.

c) Use of Alternatives in Evaluation Process

i) The selection of the 'Preferred Alternative' shifted during the evaluation from selecting the 'most appropriate' route to selecting the 'least disruptive' route. This guaranteed the selection of the least-worst alternative and not the best alternative - if one could be found.

ii) The evaluation of alternatives was inconsistently applied since the process changed from evaluating entire routes to evaluating sections of routes during the study.

d) Use of Subjective Judgements in Evaluation Process

i) The Study Team made a number of judgements about criteria which could/should have been better supported with the use of statistics and data.

3. USE OF REVISED REGIONAL POPULATION PROJECTIONS

a) Population Assumptions

In 1976, the Region estimated that, by the year 2001, 550,000 people would be living in Hamilton-Wentworth. However, in the years that followed, it became quite apparent that this population projection had been overestimated.

Thus, in 1981, the Region revised its old projection and estimated that 445,000 people would be living in Hamilton-Wentworth by 2001. The difference between these two 'Most Likely' population projections amounted to 105,000 people or 19.1 percent.

The revised population projections and the methodology used to produce them were contained in a report called: Hamilton-Wentworth Population Projections 1981 Review.[6] Population projections for the Area Municipalities were reported along with the assumptions each were based upon. A few of the important assumptions were that:

i) In Hamilton:

> "The planned North-South, East-West arterial road system will improve access from the mountain residential areas to the East Mountain Industrial Business Park to existing employment opportunities in the City's industrial areas, and to new employment opportunities in Stoney Creek."[7]

ii) In Ancaster:

> "Transportation service [to the Allarco lands] will improve with the construction of the east-west mountain arterial [of the proposed expressway]."[8]

iii) In Stoney Creek:

> "The planned North-South East-West Arterial will improve the access of the Upper Town residential areas to employment opportunities below the escarpment. The arterial will also improve the development potential of the East Mountain and Glanbrook Industrial Parks."[9]

Thus, it appears that the construction of the proposed Mountain East-West and North-South Transportation Corridor system was an important assumption in the development of the revised population projections.

The methodological concern which this raises, however, is that these same population projections were used by the Region in its Environmental Assessment Submission to justify the need for the planned expressway. Neither the Environmental Assessment Submission nor the Region's Revised Travel Forecast 1982[10] takes account of the fact that the need for the proposed expressway (as outlined in these documents) is founded upon population projections which already assume the project will be built. How, then, can the proposed expressway be objectively

evaluated (in the Environmental Assessment Submission) if the data utilized to assess the need (Hamilton-Wentworth Population 1981 Review) assumes the existence of the facility to begin with?

A further methodological issue is raised by the situation described above. The population projection of 445,000 people by 2001, called the 'Most Likely' projection, was used by the Region in estimating the need for the expressway in the Environmental Assessment Submission. Two other population projections - 'High' (479,000 people) and 'Low' (423,000 people) - were also made by the Region. The impact which these projections would have had on the need for the expressway are not stated in the Environmental Assessment Submission. Thus, no alternative scenarios, based upon the other population projections, were developed by the Region in assessing the need for the project. Only the "most Likely" scenario was elaborated upon - a scenario which was previously overestimated by 105,000 people or 19.1 percent.

b) Re-Evaluation of Major Alternatives

The revised population projections also raise a third important methodological issue. The new projections were used to reassess the need for the proposed expressway since the 1976 population projections provided the original basis for arguing the need for the project.

While this would appear to make good sense, the Region states that: "The intent was to determine if the rationale for the undertaking remained valid."[11] The question which this raises is: were all of the proposed alternatives, or, at least, the two final evaluation alternatives re-evaluated in light of the new projections, or was the 'Preferred Alternative' (No. 2) only re-assessed to determine its validity? Furthermore, were the 'no-action' and 'minor' strategies also re-evaluated?

If the 'Preferred Alternative' was the only option re-evaluated in view of the new projections, this would constitute a methodological weakness.

In the process of revising downwards the population projection from 550,000 to 445,000 persons, along with the corresponding decrease in travel demand, other previously eliminated alternatives may have become viable. Re-evaluating the 'Preferred Alternative' alone would only indicate whether or not the rationale for that alternative remained intact and not whether it was now the best alternative.

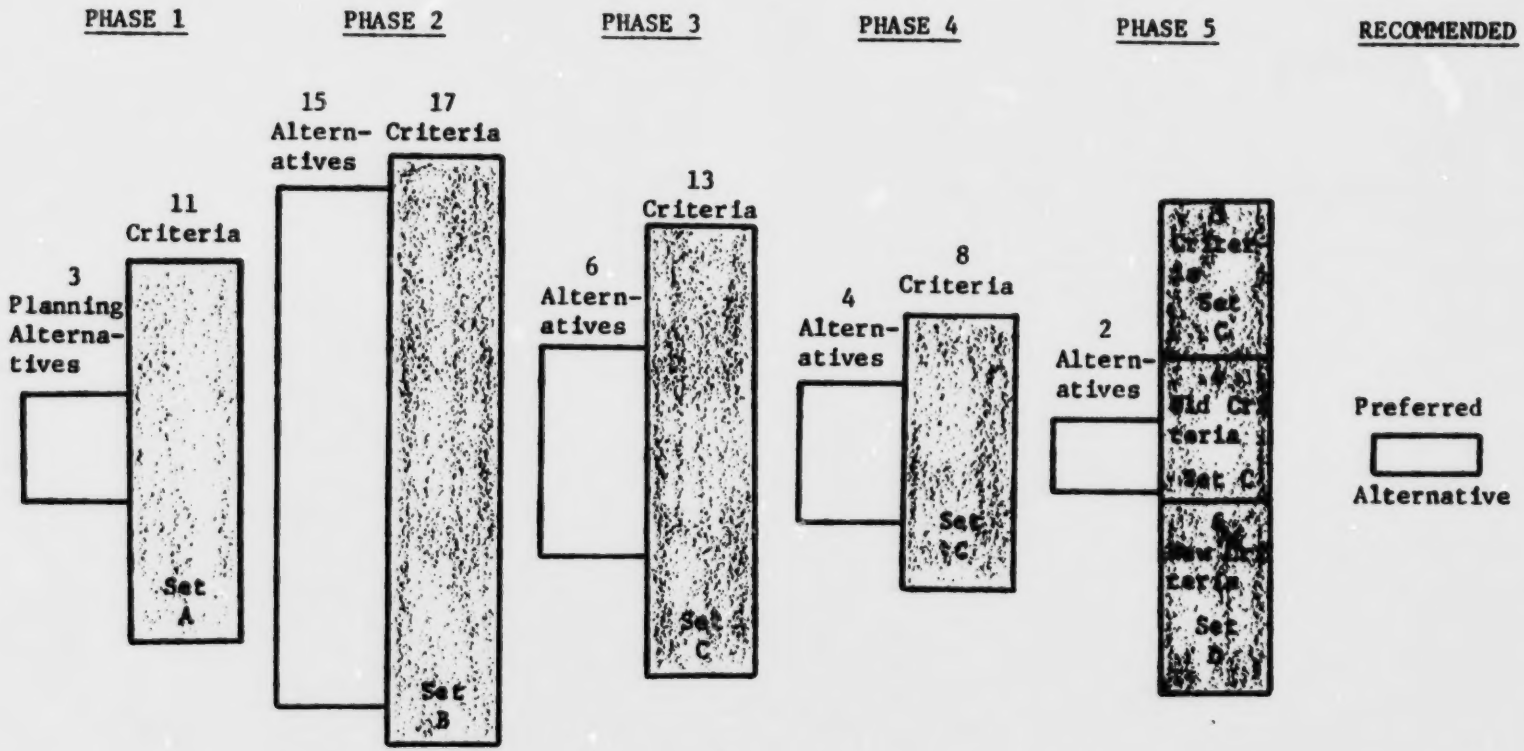
4. USE OF CRITERIA IN EVALUATION PROCESS

Prior to a discussion of the issues related to the use of criteria in evaluating alternative routes, it may be useful to describe the process of elimination of alternatives and criteria used by the Region. Figure 2 illustrates the process of elimination while Appendix B provides more detail about the procedures.

In Phase 1 of the evaluation, 11 criteria were used to assess three planning alternatives. One alternative ('Major') was then selected as the basis for developing the 15 alternative routes identified in Phase 2. These 15 alternatives were evaluated using a new set of 17 criteria (set B). In Phase 3, the remaining 6 alternatives were assessed against 13 different criteria (set C). Only 4 alternatives and 8 criteria (from the same set C) were utilized in Phase 4. In Phase 5, the final two alternatives were evaluated using 5 (set C) criteria plus 4 re-introduced (set C) criteria and 6 new criteria (set D). From the preceding, Alternative No. 2 was recommended as the 'Preferred Alternative'.

Issues and concerns related to the use of criteria for evaluating alternative routes are discussed in the remainder of this section.

FIGURE 2: OVERVIEW OF THE PROCESS OF ELIMINATION OF ALTERNATIVES/CRITERIA



	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	RECOMMENDED
DELETED:						
Alternatives	2	-	9	2	2	1
Criteria	-	-	4	5	3	-
EVALUATED:	entire alternatives	entire alternatives	entire alternatives	freeways vs. arterials in East-West Corridor	Mt. Albion to King St. in North-South Corridor	

a) Measurement of Criteria

Throughout the evaluation process, a number of criteria were used to assess the 15 alternative routes. In some cases, the way in which criteria were defined and measured was questionable. Many of the opinions used in measuring criteria could have been substantiated further.

For example, 'Development Potential' (the number of commercial, industrial and residential developments potentially affected by the alternatives) was a criterian which remained throughout the entire process. However, the method used to assess this factor was weak if, in fact, no other information was considered apart from data/opinions given by the Manager of Business Development for the City of Hamilton. This information:

> "...indicated that in the case of the East Mountain Industrial Park, a number of firms had not located in the park due to poor accessibility and the availability of other serviced industrial sites in a wider area with direct access onto regional Freeway facilities."[12]

No information was presented with regards to the development patterns of the existing industries or the likehood of attracting different or similar types of industries. Most importantly, there seems to be a direct link implied between improved transportation facilities and industrial growth. While such a link may exist, other factors such as government incentives, types of labour required, types of industry and the support structures which they need, are also major considerations. If these factors were considered, it was not made explicit in the report.

Opinions expressed by individuals which were, in turn, used to measure criteria should have been substantiated by facts/data

b) Weighting of Criteria

Questions related to the 'weighting' and 'trade-offs' among criteria are also raised by the Environmental Assessment Submission.

First, there is no explanation of which criteria are most or least important when it comes to evaluating alternatives. Was the impact on the 'Natural Environment' more or less important an evaluation criterion than the 'Number of Homes to be Acquired' when eliminating alternatives? Since no weighting of criteria is described, it is impossible to determine if significant criteria were eliminated from evaluating alternatives throughout the process.

Second, the Study Team eliminated criteria which "indicated little or no difference between the alternatives..."[13] However, the Study Team did not indicate the magnitude or range which would constitute 'little difference' amongst alternatives and, consequently, result in the elimination of the criterion. In many cases, criteria were deleted without any explanation whatsoever (other than that, they indicated little difference amongst the alternatives). The Study Team did not initially state what trade-off rationale would be used or which factors were considered more important and, hence, more heavily weighted.

At one stage, in the evaluation of the two remaining alternatives, the Study Team does appear to indicate that trade-offs will have to be made amongst the two alternatives. The Study Team states that, in evaluating the alternatives:

> "The trade-offs reduce to balancing the impacts on the social and economic environment against those effects on the natural open space environment."[14]

It is not stated, however, how or why this type of trade-off must take place. Why are the impacts on the social and economic environment to be balanced against those on the natural environment? Why, for instance, should not the impacts on the social/economic/natural environments be balanced against the cost of the alternatives?

Third, at the outset of the evaluation, the Study Team states that:

> "For the comparison of the major road expansion alternatives, the impacts of each alternative were displayed in comparative units under each factor. However, no attempt was made to arrive at an aggregate impact assessment."[15]

If no attempt was made to develop an overall impact assessment total, how then was the 'Preferred Alternative' arrived at and other alternatives deleted? If the judgements of the Study Team were the ultimate basis for eliminating factors and alternatives, then many of these judgements should have been better substantiated and more clearly delineated.

c) Shifting Use of Criteria

While the measurment and weighting of criteria poses methodological problems, so to does the shifting use of the same criteria. Specifically, the issues centre around:

a) the use of different sets of criteria;
b) the deletion of criteria;
c) the re-introduction of criteria; and
d) the addition of criteria when evaluating alternatives.

At various stages throughout the evaluation process, as many as four distinct sets of assessment criteria were used to eliminate alternatives. Table 1 highlights the use of different sets of criteria (as previously outlined in Figure 2 and Appendix B).

TABLE 1: USE OF DIFFERENT SETS AND NUMBERS OF CRITERIA

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Set of Criteria	A	B	C	C	C and D
No. of Criteria	11	17	13	8	9 and 6

No explanation is given for the use of four distinct sets of criteria as the evaluation process proceeds. While there is comparability between some criteria in different sets, the nature and number of criteria is constantly changing (as Appendix B illustrates). There is no consistent approach to evaluating alternatives based on a standard set of criteria. This makes a fair comparison of alternatives impossible.

Also, throughout the evaluation process, criteria are deleted as each phase continues. This is in keeping with the Study Team's 'process of elimination' methodology. However, in Phase 3 of the evaluation, 13 criteria were used to assess 6 alternatives. In Phase 5, 15 criteria were used to assess only 2 alternatives. Thus, while the number of alternative routes were reduced (as the methodology required), the number of criteria increased. One would have expected both the number of alternatives and criteria to be reduced accordingly throughout the

evaluation. This narrowing process did not occur. The logic of the methodology appears to have been applied inconsistently.

Furthermore, four particular criteria were eliminated from the evaluation in Phase 4 on the basis that they "...indicated little or no difference between the alternatives..."[16] These factors were:

6. Impact on Recreation;
8. Number of Businesses to be Acquired;
11. Natural Environment; and
12. Scenic Resources.

These same factors, however, were re-introduced in Phase 5 of the evaluation without explanation. Questions remain regarding the rationale for re-introducing a number of criteria.

Finally, while some criteria were being deleted and re-introduced, other new criteria were being added. During Phase 5, the evaluation of the two remaining alternatives inexplicably included six additional new criteria (although two appear to be related to previous sets of criteria). The importance of these factors was not stated. If they were of importance, one would wonder why they were not considered during the previous phases in the evaluation. The addition of new criteria during the final stage of the evaluation contradicts the 'process of elimination' methodology employed by the Study Team.

d) Appearance of Criteria

The approach of the Study Team, involving the elimination of criteria which did not highlight differences between alternatives,

raises questions about the overall 'suitability' or 'appearance' of the 'Preferred Alternative'.

For instance, in Phase 4 of the evaluation process, two of the five criteria eliminated were:

11. Natural Environment; and
12. Scenic Resources.

These criteria were excluded because they indicated little difference between alternatives. But, while this is true, their elimination ignores the fact that the impact associated with these criteria was assessed as 'severe' in almost all cases by the Study Team. Since all alternatives showed severe impact, the criteria were eliminated because little variation was indicated. Therefore, when evaluating the remaining alternatives, the severe impacts on the environment would not be indicated nor considered as a significant factor! The result is that the 'Preferred Alternative' would likely have the appearance of fewer negative impacts than would actually exist. Methodologically, the process of quantitatively eliminating criteria ignores the qualitative value of the criteria in arriving at a 'Preferred Alternative'.

5. USE OF ALTERNATIVES IN EVALUATION PROCESS

Two particular issues related to the evaluation of alternative routes are discussed in this section.

a) Choosing the Best Alternative

At the start of the Environmental Assessment Submission, the Region states that, in submitting the document, it is seeking:

> "agreement that the selected roadway alternative satisfies the purpose of the undertaking and represents the most appropriate route [emphasis added]."[17]

After conducting a complex evaluation of alternatives, the Study Team concluded that the 'Preferred Alternative' was selected because:

> "...it was the least disruptive [emphasis added] to the community and provided the best opportunity to achieve the desirable objectives for growth and development in the Region."[18]

Therefore, at some stage in the evaluation process, the initial purpose changed from choosing the most appropriate route to choosing the least disruptive one. Although this distinction may appear insignificant, it does have important implications.

The selection of a 'most appropriate' route would appear to allow for the possibility that no alternative route would prove appropriate due to a wide range of negative impacts (e.g. all routes may prove inappropriate). However, selecting a 'least disruptive' route implies choosing the least-worst alternative. Such an approach ignores the magnitude of negative impacts associated with the various routes because it precludes the possibility that all routes may be inappropriate.

This situation was highlighted previously where factors which indicated 'severe' negative impact were excluded from the evaluation because they indicated little difference between alternatives. Instead of determining where the best route for an expressway might be - if one can be found to begin with - the

Study Team has opted for selecting the least-worst route from a pre-set number of alternatives. Thus, there is no 'tipping point' at which the negative impacts can outweigh the positive impacts - the study methodology does not allow for this possibility.

b) Evaluating Sections of Alternatives

In Phases 1 to 3 of the valuation process, entire alternative routes were compared with one another. In Phases 4 and 5, however, the evaluation did not adhere to this process since sections of alternative routes were paired and compared.

In Phase 4, four alternatives were to be evaluated. The routes were Alternatives No. 2, 3, 10 and 11. The Study Team then decided to pair Alternatives No. 2 vs. 3 and Alternatives No. 10 vs. 11 and focus only on the East-West corridor for each route. Alternatives No. 2 and 10 were then selected for the final evaluation.

In Phase 5, only the section in the North-South corridor between King Street East and Mount Albion Road was considered in evaluating Alternatives No. 2 and 10. Alternative No. 2 was consequently recommended as the 'Preferred Alternative'.

While the Study Team intended to conduct a 'process of elimination' of alternative routes, they did not state that the analysis would shift from evaluating entire routes to evaluating portions of routes. The result of this procedure was that, in the final stage of evaluation, only one-third of the entire alternative routes (No. 2 and 10) were examined and compared. Furthermore, criteria which would have indicated severe impacts from the alternatives were never incorporated in the latter stages of the evaluation. The methodology has been inconsistently applied in Phases 4 and 5 of the evaluation process.

6. USE OF SUBJECTIVE JUDGEMENTS IN EVALUATION PROCESS

A study of the magnitude of the Region's Environmental Assessment Submission requires the collection of a large volume of data, statistics and information in order to assess the impacts associated with proposed alternatives. As such, certain impacts can be easily quantified (e.g. number of homes to be acquired) while other criteria are not as easily determined (e.g development potential). In the case of the latter type of criteria, the Study Team used its own judgement about the likely impacts associated with the project. While this may be considered necessary, and even required, in a large number of cases:

> "The significance of the impacts associated with each alternative was judged subjectively by the Study Team..."[19]

In fact, in Phase 2 of the evaluation process, the Study Team used its own judgement in assessing the impact of almost two-thirds (10 of 17) of the criteria. In Phase 3, almost 25 percent (4 of 17) of the impacts were judged by the Study Team. This raises the question of how many judgements should, reasonably, be subjectively made in such a report since, in a number of instances, opinions were not supported adequately with hard information/data.

For example, when assessing 'social impact' (neighbourhood disruption) in Phase 2, the Study Team reported that:

> "The assessment was made considering existing neighbourhood and community boundaries and the Study Team's local knowledge of neighbourhood linkages... The significance of the impacts associated with each alternative was judged subjectively by the Study Team as significant, moderate or low."[20]

Granted that while it is difficult to numerically assess all social impacts, one still needs to understand the extent of the Study Team's knowledge of neighbourhood linkages or, at least, what factors were considered in this assessment. (Also see previous section on Measurement of Criteria re: example of 'development potential' assessment).

While the Study Team is to be credited for attempting to judge and quantify some difficult criteria, questions remain about the number and supportability of some of the expressed opinions. Opinions could have been better supported with the use of hard information.

D. REVIEW OF THE PUBLIC PARTICIPATION PROGRAM

The intent of this section of the report is to describe and comment upon the public participation program undertaken by the Region throughout the process of selecting a 'Preferred Alternative'.

1. DESCRIPTION OF THE PROGRAM

A public participation program is a requirement for a project of the magnitude as the Region is proposing.

The Region's stated purpose in conducting a public participation program was to provide:

> "...a forum for the public to openly discuss the evaluation and selection of alternatives and ensure that the planning reflected the opinions and values of the public."[21]

With this in mind, the Region developed a 3 part program which it conducted during the Phase 1, Phase 3 and Recommended stages. Figure 3 provides an overview of the public participation program.

The first contact with the public occurred during Phase 1 of the evaluation process (July 1978). Open houses were held at two local schools in order to outline projected travel demand figures, planned developments and deficiencies/constraints of the present road network. No alternatives were presented for public comment. The study corridor area was, however, displayed for public comment. The study corridor area was, however, displayed for public viewing. Public brochures were distributed to 200 groups and individuals. One-quarter of the questionnaires were returned (refer to Appendix C, p. C-1 for sample questionnaire).

No public participation was solicited during Phase 2 of the project.

The second contact with the public occurred during Phase 3 of the evaluation process (May 1979). Open houses were held at five local schools in order to allow the public the opportunity to review the impact assessment and state their route preferences. Six alternatives were presented for public comment. Questionnaires were distributed to 1,800 people at the open houses. Twenty-two percent were returned for analysis (refer to Appendix C, p. C-2 for sample questionnaire). As well, advertisements were printed twice in the newspaper - 753 completed questionnaires were returned. Respondents were asked to state their preferences among the six alternatives. During this stage, 73 letters were received by the Study Team and on July 18, 1979 at a public meeting of Regional Council, 32 briefs were received from the community.

FIGURE 3: OVERVIEW OF THE PUBLIC PARTICIPATION PROGRAM

	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	RECOMMENDED
Date:	July 1978	January 1979	May 1979	August 1979	August 1979	June 1980
Alternatives Presented to the Public:	None (study corridor only)	No public participation program	Alternative No. 2 Alternative No. 3 Alternative No. 4 Alternative No. 10 Alternative No. 11 Alternative No. 15	No public participation program	No public participation program	Alternative No. 2
Major Input Medium:	2 Open Houses		*(A) 5 Open Houses (B) 2 Newspaper Advertisements (C) 105 Letters and Briefs			4 Open Houses
Questionnaires:						
a) No. Distributed	200		*(A) 1800 (B) unknown			Not Stated
b) No. of returns	50		*(A) 399 (B) 753			120
c) Return Rate	25%		*(A) 22% (b) unknown			Not Known
Attendance at Open Houses:	74 people		Not Stated			354 people

*Items identified by (A) refer to open house activities.
Items identified by (B) refer to newspaper advertisements.
Items identified by (C) refer to letters and briefs from the public.

No public input was solicited during Phases 4 and 5 of the project.

The third and final contact with the public occurred during the Recommended stage of the evaluation process. Alternative No. 2 was presented as the 'Preferred Alternative' by the Study Team (June 1980). Open houses were held at four local schools in order to: 1) present detailed information on the selected alternative and 2) receive comment on a possible recreation plan for the Red Hill Creek Valley. In total, 120 questionnaires were returned for analysis at the open houses (refer to Appendix C, p. C-3 for sample questionnaire). It is not known how many questionnaires were made available to the public.

2. ISSUES AND CONCERNS RELATED TO THE PROGRAM

The use of public input and the presentation of alternatives during the public participation process raises questions about the nature of the program itself.

a) Use of Public Input

One of the principles of the Region's public input program was "to integrate the public involvement program throughout all phases of the project."[22]

The Environmental Assessment Submission, however, does not clearly indicate, at any stage, how public input was incorporated in the decision-making process and what impact it had upon the Study Team's recommendations. There is no reported relationship between the preferences of the public and those of the Study Team. The question which remains is: how important was public input to the Study Team (e.g. what 'weight' was it given) and in what way was it incorporated into the process of recommending a 'Preferred Alternative'?

During the Phase 3 stage of the participation program, for example, the public was asked to rank its preferences for six alternative routes (No. 2, 3, 4, 10, 11, and 15). This was the only time the public was asked to respond in this manner.

Although the Study Team recommended Alternative No. 2, public input clearly did not indicate support for this route.

As Table 2 illustrates, overall, the public ranked Alternative No. 2 as fifth out of six routes. Only Alternative No. 15 consistently ranked lower than Alternative No. 2.

TABLE 2: RANKING OF ALTERNATIVES BY THE PUBLIC

RANK	OPEN HOUSE RESULTS	NEWSPAPER RESULTS	TOTAL
1	Alternative No. 4	Alternative No. 3	Alternative No. 3
2	Alternative No. 3	Alternative No. 4	Alternative No. 4
3	Alternative No. 10	Alternative No. 11	Alternative No. 11
4	Alternation No. 11	Alternative No. (2)	Alternative No. 10
5	Alternative No. (2)	Alternative No. 10	Alternative No. (2)
6	Alternative No. 15	Alternative No. 15	Alternative No. 15

The results from the open house questionnaires indicate a ranking of 5 out of 6 in terms of preference. (Twenty percent of the respondents did not prefer any of the six alternatives). The newspaper questionnaire results show a fourth place ranking.

If the preferences indicated by the public were important to the Study Team in their deliberations, it does not appear that they were ultimately given much weight. It is also not clear how the public's choices were incorporated into the planning process despite whatever their importance to the Study Team might have been.

Related to the issue of the 'utility' of public input is the nature of the questionnaires themselves (which were distributed to the public). The questionnaires are very general in nature, leading one to speculate on the utility of the answers which would ultimately be solicited. Their design does not readily facilitate comment on more than a limited range of criteria and options. The public is given a set number of choices and asked to rank their acceptability (e.g. in Phase 3). There is no provision for the public to state its concerns regarding the need for the project or other options which might be preferred - except under the heading of 'Other Comments'.

At the end of the Phase 1 stage of public participation, the Study Team concluded that:

> "...the first series of information centres were successful and we [the Study Team] recommend this format [of open houses] be continued for the next series of meetings at the end of Phase 3. The relatively small turnout can be largely explained by the fact that no roadway alternatives were displayed for the public to react to."[23]

The 'success' of this stage of the public participation program is questionable since only 74 people attended the open houses. This resulted in the return of 50 questionnaires or a response rate of 25 percent. Although the Study Team tries to

explain the poor turnout by the lack of alternatives for the public to react to, this still raises questions about the claimed 'success' and utility of such a public input procedure.

b) Presentation of Alternatives for Public Input

If a citizen had participated in the planning process during all stages of public input, he/she would have been exposed to the following alternatives:

PHASE 1	- No Alternatives
PHASE 3	- 6 Alternatives
RECOMMENDED	- 1 Alternative

How much knowledge of all possible routes would citizens have had exposure to, then, during the project?

During Phase 1, no alternatives were offered for public viewing. Only the 'Study Corridor' was presented to the public. By the time the Phase 3 program was established to prevent 6 alternatives, the Study Team had eliminated 9 of 15 alternatives from public viewing. Thus, the public never saw or commented upon two-thirds of all the potential routes identified in Phase 2. The final stage in the participation process only asked for comment on the 'Preferred Alternative'. The public was not asked for input during Phases 4 and 5 of the project when 5 alternatives were deleted.

Throughout the entire planning process, the public was only once asked to state its preference - if any - for a particular route and even when this opportunity arose, only one-third of the alternatives were shown.

Furthermore, the geographic diversity of the 6 alternatives presented in Phase 3 was very limited. In fact, not one of any of the alternatives ever shown to the public did not go through at least part of the Red Hill Creek Valley! All of the 6 alternatives presented went through the Valley between the Queen Elizabeth Way and King Street East (except for a portion of Alternative No. 15). As well, all of the alternatives (except for part of Alternative No. 4) proposed an East-West Corridor running along Limeridge Road.

E. POPULATION GROWTH AND DISTRIBUTION IN THE REGION

The following section examines the figures used in the Environmental Assessment Submission to assess the need for the proposed expressway facility. An attempt has been made to verify the accuracy of the population and housing projections used by the Region in justifying the need for the project, as well as examining the implications of a shifting population.

A central argument put forward by the Region in support of the construction of the Mountain East-West and North-South Transportation Corridor is the expected growth of population in the so-called 'Mountain Urban Area'. The particular targeted area of rapid growth in the Mountain Urban Area is the region south of Limeridge Road in Hamilton, the Allarco development in the Town of Ancaster and the Heritage Green area in the City of Stoney Creek.

Controversy, however, has existed regarding the accuracy and validity of the Region's population estimates especially since previous forecasts have consistently been over-inflated. This, in turn, has led to the re-evaluation and lowering of estimates on several occasions.

A central question still remains, though: "Where will all the people be coming from?". The Region is forecasting a minimal amount of external immigration and a low fertility rate (based on Ontario Provincial statistics). Therefore, any shift in population must occur largely through internal Regional migration. Critical to the debate are the number of persons per dwelling unit (p.p.d.u.) and the rate of household formation. The following discussion examines these figures along with the Region s population forecasts and the logic behind the prediction.[24]

1. THE POPULATION SHIFT

The Region's population estimates have been calculated by multiplying the number of persons per dwelling unit (p.p.d.u.) by the number of dwellings. From these arise the number of persons per planning division as well as City and Regional values for 1980 and predictions for 2001 (see Appendix D). From Appendix D, it can be observed that the Region is predicting that the City of Hamilton will have an estimated net loss of 4,150 people between 1980 and 2001, yet the Mountain Urban Area is estimated to increase in population by more than 30,000. While this appears to be a serious anomlie, when one examines the Region's population projections for all of Hamilton-Wentworth, the estimate appears to be consistent. Following is an explanation of why the Region's 'Most Likely' estimates are, then, internally consistent.

a) Regional Population Projections

Appendix E consists of a map detailing the Region of Hamilton-Wentworth's thirty planning divisions, half of which are in the City of Hamilton. The lower city, from the foot of the Escarpment to Hamilton Harbour, contains nine divisions labelled 6100 to 6900. The Mountain Urban Area encompasses the six planning divisions of Hamilton Mountain, three of which are highly

populated (7100-7300) and three through which the expressway itself will be constructed (7400-7600). The former three are predicted to experience little, if any, population increase between 1980 and 2001, while the latter are estimated to grow by more than 20,000 persons. Also included in the Mountain Urban Area are the Heritage Green area in the City of Stoney Creek (planning division 5400) formerly known as Satellite City, and the Allarco development in the Town of Ancaster.

To evaluate if the Region's overall population estimates concur with those used in the expressway studies, a detailed comparison of the figures is required. The change in the City and the Mountain Urban Area populations must be consistent with the overall Regional change in population between 1980 and 2001 if the expressway study's calculations and justification of need are to be considered valid. Table 3 details the changes in Hamilton, Stoney Creek and Ancaster's population while Table 2 does the same for Flamborough, Dundas, Glanbrook and the Region in total. All the expressed values are either increases (+) or decreases (-) in the population between the 1980 figures and the 2001 estimates.

b) Population Change in Hamilton/Stoney Creek/Ancaster (Table 3)

The Mountain Urban Area consists of four segments:

1) developed Mountain (planning divisions 7100-7300);

2) Mountain south of Limeridge Road (planning divisions 7400-7600);

3) Heritage Green area (planning division 5400);

4) Allarco development.

TABLE 3: POPULATION CHANGE IN HAMILTON/STONEY CREEK/ANCASTER

	1980 Population	2001 Population	Population Difference
1. Mountain Urban Area			
Heritage Green	5,453	16,002	+ 10,549
Developed Mountain (7100-7300)	93,320	94,020	+ 700
Mountain South of Limeridge Rd. (7400-7600)	17,226	37,120	+ 19,894
Allarco development	0	16,857	+ 16,857
Total	115,999	163,999	48,000
2. Lower City			
Planning Divisions 6100-6900	195,534	170,790	- 24,744
3. Other Areas			
Remainder of Ancaster (excluding Allarco)	14,227	14,517	+ 290
Remainder of Stoney Creek (excluding Heritage Green Area)	30,631	35,973	+ 5,342
Total	44,858	50,490	+ 5,632
Net Change in Population			
1) Mountain Urban Area	115,999	163,999	+ 48,000
2) Lower City	195,534	170,790	- 24,744
3) Other Areas	44,858	50,490	+ 5,632
Net Total	356,391	385,279	+ 28,888

The lower City, as previously mentioned, consists of planning divisions 6100-6900. Lastly, as Allarco and the Heritage Green area comprise sections of Ancaster and Stoney Creek, respectively, the remaining planning sections of these municipalities must be included in order to do an accurate comparison with Regional values. Thus, they too are included in the change in population calculations under the heading of 'Others" (in Table 3). Overall, the total geographic area included in this assessment is the City of Hamilton, the City of Stoney Creek and the Town of Ancaster. When the change in population between 1980 and the 2001 estimate is made for this geographic area, an increase of nearly 29,000 people is predicted.

c) Population Change in Flamborough/Dundas/Glanbrook and the Region (Table 4)

The Region is forecasting that there will be an increase of 34,852 persons in Hamilton-Wentworth between 1980 and 2001. To confirm that these estimates coincide with those stated in the expressway studies, all that is required is a simple subtraction of values. The change in Table 3 values consist not only of the population estimates for Hamilton but also for Ancaster and Stoney Creek. Thus, knowing the predicted change for the Township of Flamborough and Glanbrook and the Town of Dundas, the estimated change in population for Ancaster, Stoney Creek and Hamilton can be easily determined and verified against the resultant increase of 28,888 persons in Table 3. This (Table 4) calculation produced a result of +29,824 persons.

TABLE 4: POPULATION CHANGE IN FLAMBOROUGH/DUNDAS/GLANBROOK AND THE REGION

	1980 Population	2001 Population	Population Difference
A. Hamilton-Wentworth	410,648	445,500	+ 34,852
B. Flamborough, Dundas and Glanbrook	53,472	58,500	+ 5,028
C. Hamilton, Stoney Creek and Ancaster (A-B)	357,176	387,000	+ 29,824

Population Equations:

$\therefore$ $\triangle$ Hamilton/Stoney Creek/Ancaster population (Table 3) $\doteq$ $\triangle$ Hamilton-Wentworth population - $\triangle$ Flamborough/Dundas/Glanbrook population (Table 4)

$\therefore$ 28,888 $\doteq$ 34,852 - 5,028

28,888 $\doteq$ 29,824*

*The resultant variation amounts to 936 persons or about three percent.

Thus, the change in the Flamborough/Dundas/Glanbrook and Regional population appears to be consistent with the increase in the Hamilton/Stoney Creek/Glanbrook population to 2001.

However, two points need to be made about the apparent consistent nature of the figures. First, it may still be likely that the Region has overestimated its population projections as happened in 1976. The 'Low' population projection (made by

the Region) of 423,000 persons by 2001 may prove to be a more likely estimate in view of the slow growth situation witnessed in Hamilton-Wentworth in recent years. Thus, doubts about the ultimate utility of the projected population are still well founded.

Second, while the overall figures may appear statistically consistent in nature, one must still account for the large internal migration that must occur to validate the prediction. As the Region itself points out:

> "...although the overall population in the City of Hamilton is projected to decrease slightly, there will be an increase of approximately 20,000 persons residing on the Hamilton Mountain [30,000 in the Mountain Urban Area] and an equivalent decrease in the lower city."[25]

The planning divisions in the lower city which would be particularly affected by the expected decrease in population are 6500 and 6600 (located in the central and east portions of the City). This raises the question of whether or not the Region is justified in predicting that 55% of the lower city's projected population loss of 13,515 people will come from two traditionally stable districts. A further examination of population trends in these two planning divisions is therefore required.

2. PLANNING DIVISIONS 6500 AND 6600: A SHIFTING OR STABLE POPULATION?

Appendices F and G contain all the relevant values concerning the above mentioned planning divisions: population, dwelling units, persons per dwelling units (p.p.d.u.), number of families, singles and unrelated households. Trend analysis confirms the

Region's population estimates are reasonably accurate, however, an examination of the other factors adds a different perspective to the situation.

The Region, for planning divisions 6500 and 6600, is predicting a loss of only 200 dwelling units in an area that is predicted to lose over 13,000 people during the same time frame (1981-2001). The critical factor is the number of persons per dwelling unit (p.p.d.u.) and logically, then, it appears that the trend of decreasing family size and the increasing number of singles will be the primary impacting variable on the area. A closer examination of the potential number of families and singles - even using the most extreme values (see Appendix G) - appears to show that the decreased number of families predicted to be living in the two planning divisions will be balanced by increasing numbers of singles and/or unrelated households.

Thus, household numbers are basically stagnant as opposed to decreasing. A shift in family composition and smaller families appears to be occurring as opposed to mass emigration to the Mountain Urban Area. There are more smaller household arrangements rather than a large displacement of families occurring. The inter-urban migration will not necessarily be coming from these planning divisions nor the lower city itself, rather, what is occurring is a restructuring of households. There is no mass loss of people. No exodus of 30,000 people required for the Mountain Urban Area to balance in the Region's population projections appears to be coming from the lower city. The Region's estimates appear consistent for individual planning divisions but decreases in population that might occur in these areas cannot be assumed to transfer directly to the Mountain Urban Area in the form of increases in population by any logical or inferential means.

The internal migration from the areas outside Hamilton cannot account for the influx, either. Thus, while predicting increase in population, the Region has shown no indication where these individuals and families might come from. While the figures for each planning division with a decreasing population appear to be valid accounts of what is occurring in a particular area, there is no justification for claiming the difference between 1980 and 2001 figures equates to displaced persons who will move into a new development on the Mountain. The numbers justify a changing family and household internal composition not a shifting family population as the overall accumulation of numbers attempts to infer. Using the expressway as a measure of growth is just as methodologically unsound as attempting to infer a change in household composition equates to displaced people moving into as yet undeveloped areas.

Thus, while the predictions and forecasting are potentially internally consistent for some planning divisions, these same predictions have limited external validity. Neither the population growth on the Mountain nor the source of this growth has been adequately explained by the Region in any format or context.

F. CONCLUSIONS

The Regional Municipality of Hamilton-Wentworth, in proposing the construction of the Mountain East-West and North-South Transportation Corridor facility, has utilized a 'process of elimination' methodology. This methodology is founded upon Regional projections of population and households and contained in the Environmental Assessment Submission.

Based upon a thorough review of the Region's Environmental Assessment Submission, it is concluded that:

1. The process of evaluation, used by the Region for determining the 'Preferred Alternative', has methodological weaknesses and flaws.

2. The public participation program implemented by the Region presented a limited number of options to the public in a fashion which did not fully facilitate their involvement.

3. While the Region's population projections appear to be statistically consistent overall, unexplained questions remain about the logic and validity of some of the assumed internal population shifts.

4. If one accepts the notion of a direct link between the soundness of a methodology and the soundness of a resulting recommendation, then it can be concluded that the validity of the Region's 'Preferred Alternative' is challengable in view of the methodological weaknesses inherent in the evaluation process.

G. ENDNOTES

[1] Regional Municipality of Hamilton-Wentworth, Mountain East-West and North-South Transportation Corridor: Environmental Assessment Submission, Volume I, December, 1982.

[2] Government of Ontario, Review Under the Environmental Assessment Act: Mountain East-West and North-South Transportation Corridor Environmental Assessment, p. 2-4

[3] Ibid, p.1

[4] Regional Municipality of Hamilton-Wentworth, Mountain East-West and North-South Transportation Corridor: Environmental Assessment Submission, Volume I, p. 2-1.

[5] Ibid, p. 5-21

[6] Planning and Development Department of the Regional Municipality of Hamilton-Wentworth, Hamilton-Wentworth Population Projections 1981 Review, September, 1981.

[7] Ibid, p. 50

[8] Ibid, p. 48

[9] Ibid, p.51

[10] Regional Municipality of Hamilton-Wentworth, Mountain East-West and North-South Transportation Corridor: Revised Travel Demand Forecast 1982, 1982.

[11] Regional Municipality of Hamilton-Wentworth, Mountain East-West and North-South Transportation Corridor: Environmental Assessment Submission, Volume I, p. 1-10.

[12] Regional Municipality of Hamilton-Wentworth, Mountain East-West and North-South Corridor Study: Phase 3 - Detailed Impact Assessment and Evaluation, Appendix E, p. 26.

[13]Regional Municipality of Hamilton-Wentworth, Mountain East-West and North-South Transportation Corridor: Environmental Assessment Submission, Volume I, p. 5-50.

[14]Ibid, p. 5-53

[15]Ibid, p. 5-21

[16]Ibid p. 5-50

[17]Ibid, p. 1-2

[18]Ibid, p. 5-57

[19]Ibid, p. 5-25

[20]Ibid, p. 5-25

[21]Regional Municipality of Hamilton-Wentworth, Mountain East-West and North-South Corridor Study: Phase 1 - Future Road Needs and Data Collection, p. 52.

[22]Ibid, p. 52

[23]Ibid, p. 54

[24]All figures, unless otherwise stated, come either directly from Regional reports or Statistics Canada.

[25]Regional Municipality of Hamilton-Wentworth, Mountain East-West and North-South Transportation Corridor: Revised Travel Demand Forecast, 1982, p. 3.

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Regional Municipality of Hamilton-Wentworth. Mountain East-West and North-South Corridor Study: Phase 3 - Detailed Impact Assessment and Evaluation, August, 1979.

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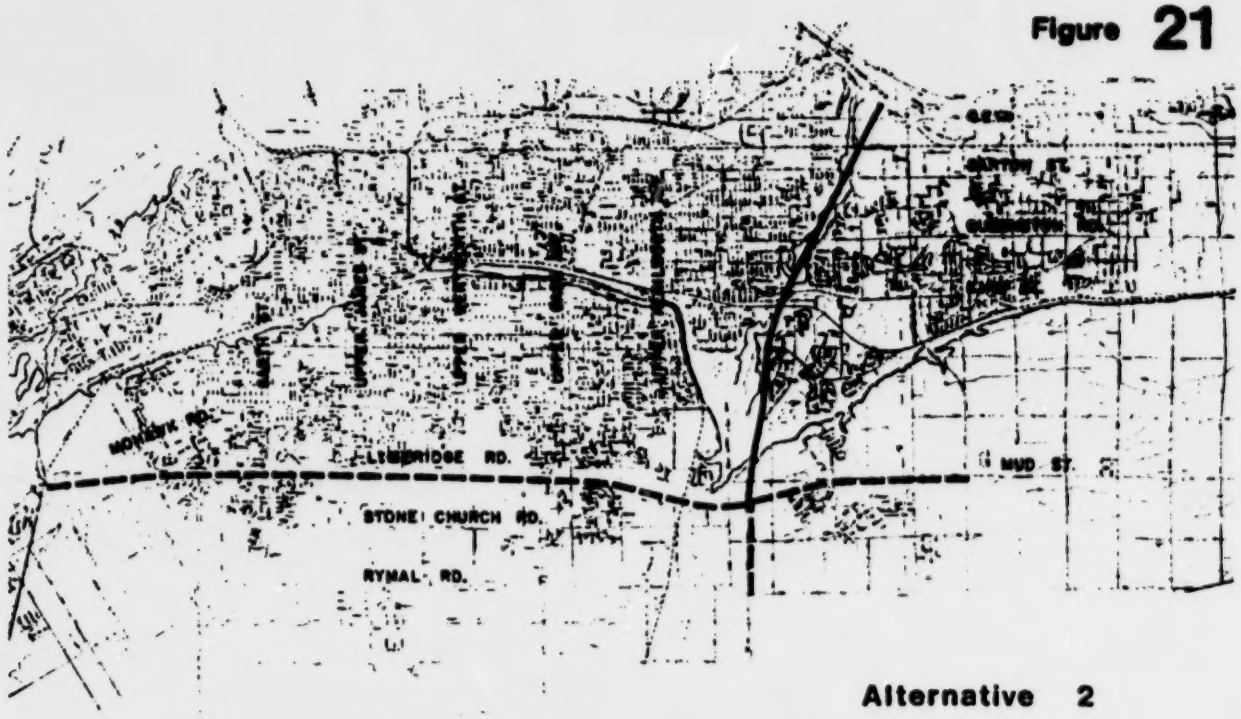
Regional Municipality of Hamilton-Wentworth. The Regional Municipality of Hamilton-Wentworth Official Plan, June 1980.

Statistics Canada. Hamilton Census Tracts: Selected Social and Economic Characteristics, September 1983.

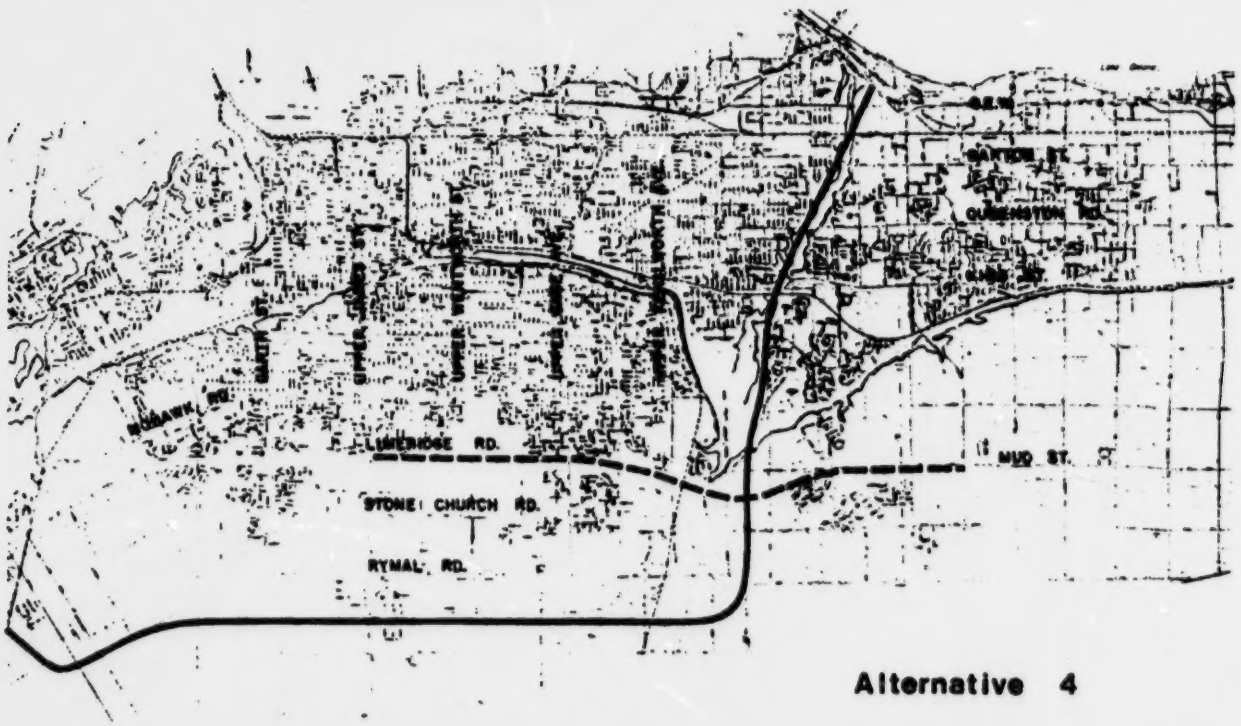
APPENDIX A

LOCATION OF MAJOR ALTERNATIVE ROUTES

Figure 21



Alternative 2

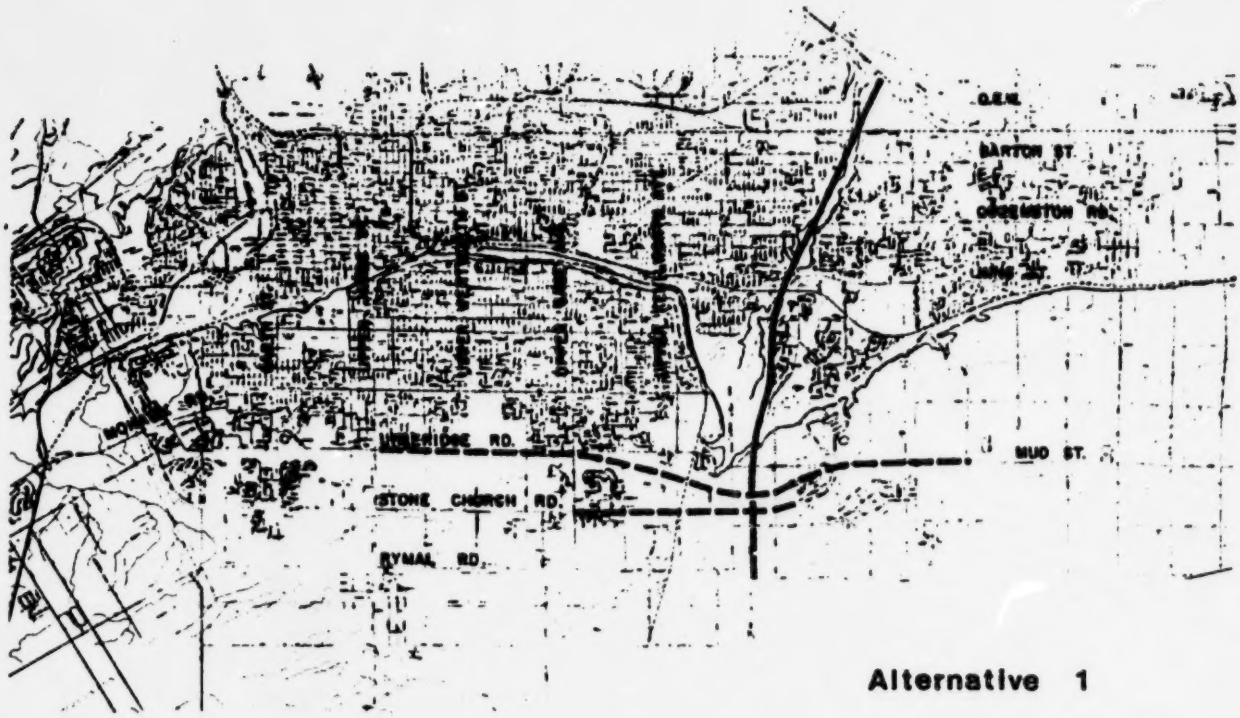


Alternative 4

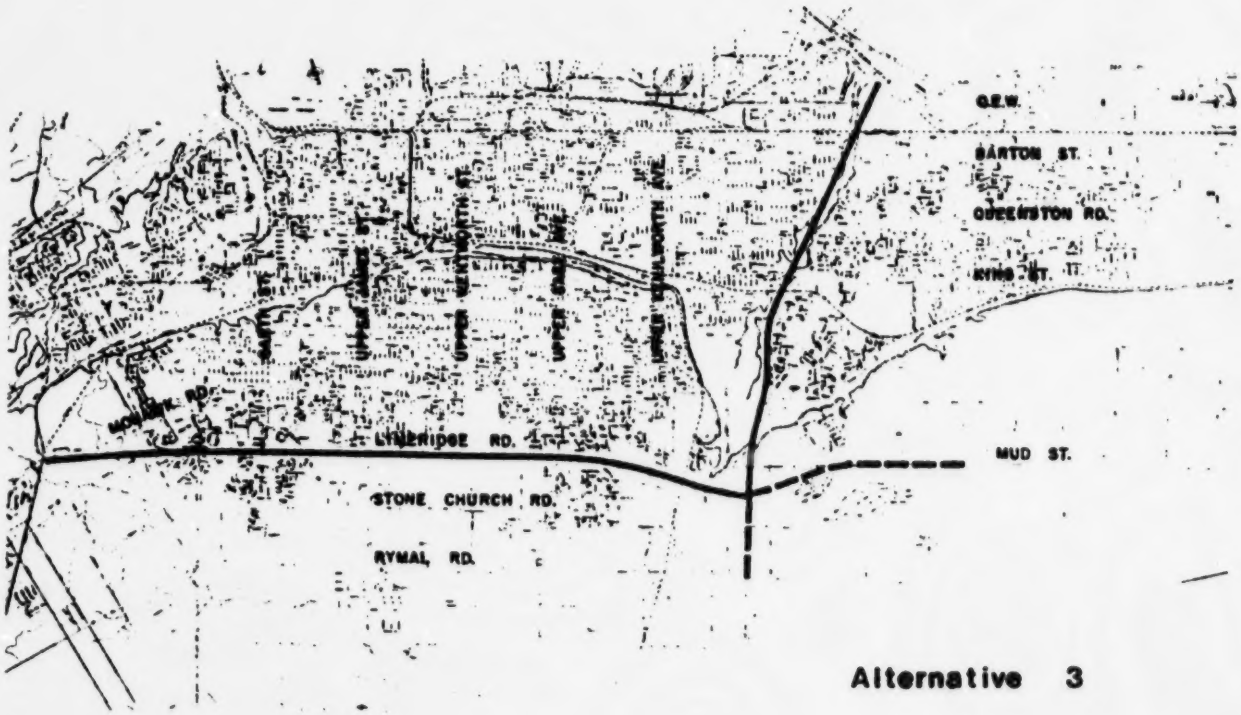
MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

MAJOR ROADWAY ALTERNATIVES

ALTERNATIVES; 1, 2, 3, 4



Alternative 1



Alternative 3

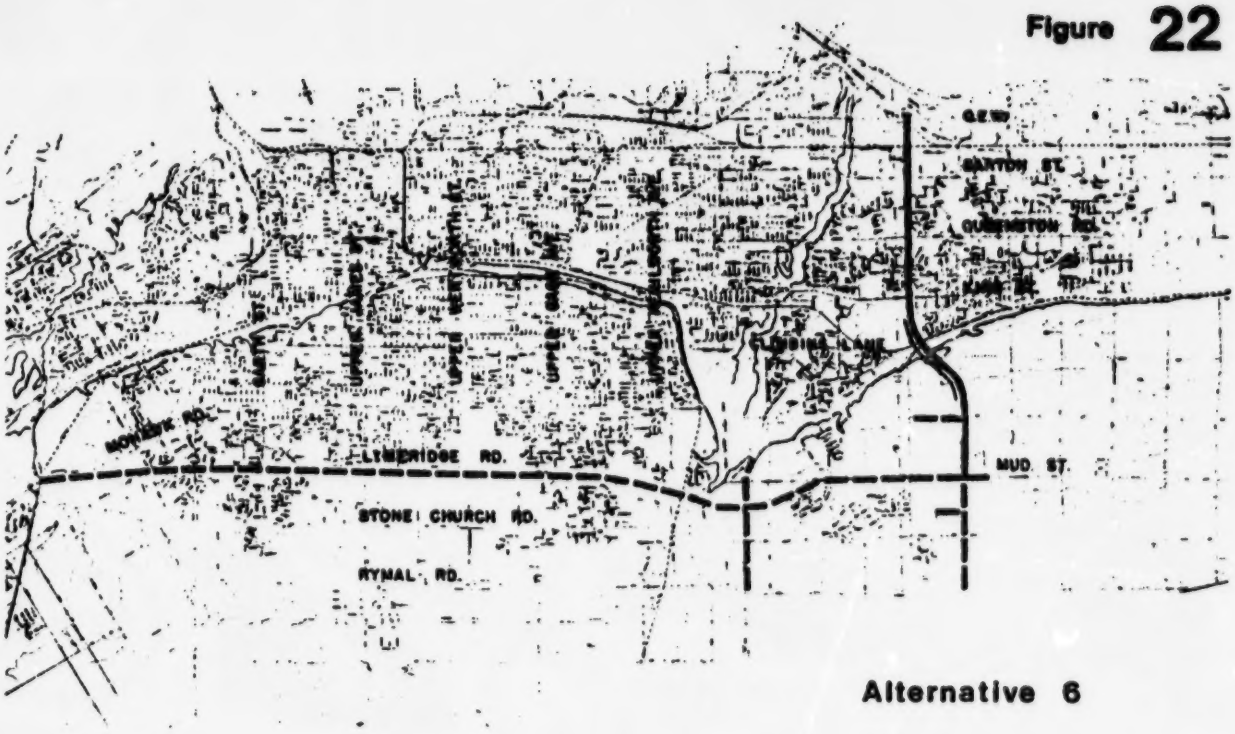
LEGEND:

——— FREEWAY FACILITY

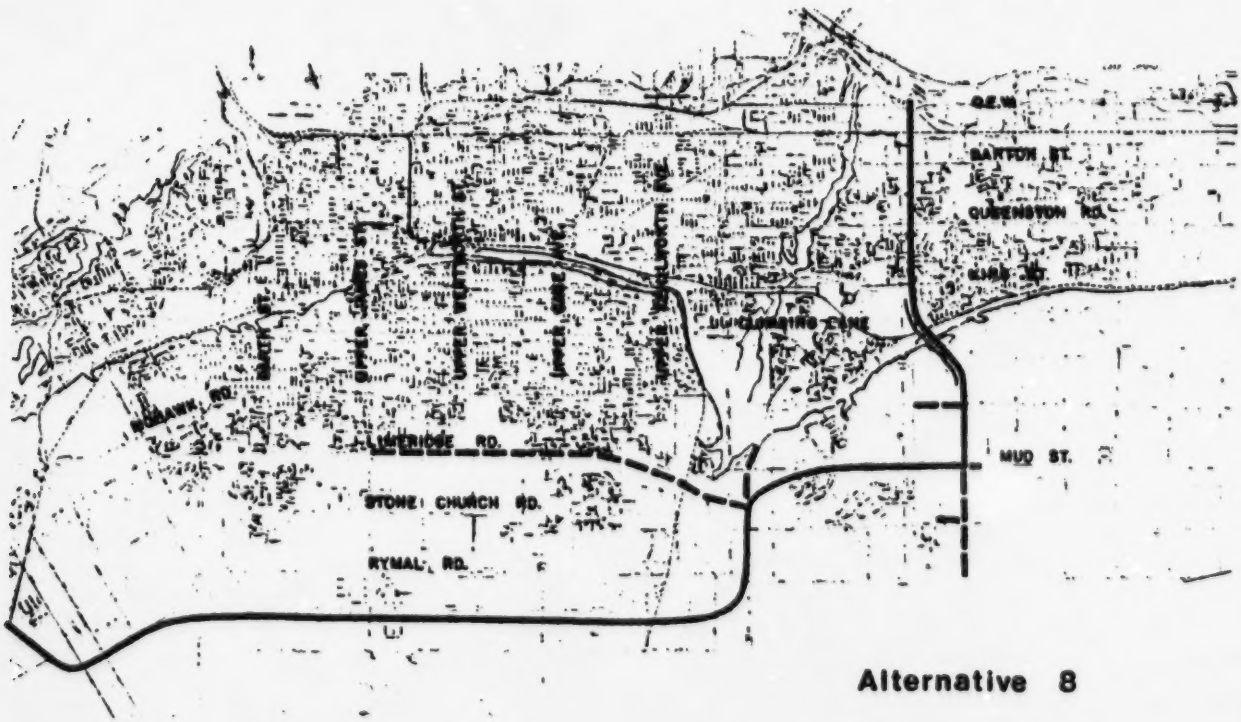
– – – ARTERIAL ROAD

DeLCan

Figure 22



Alternative 6

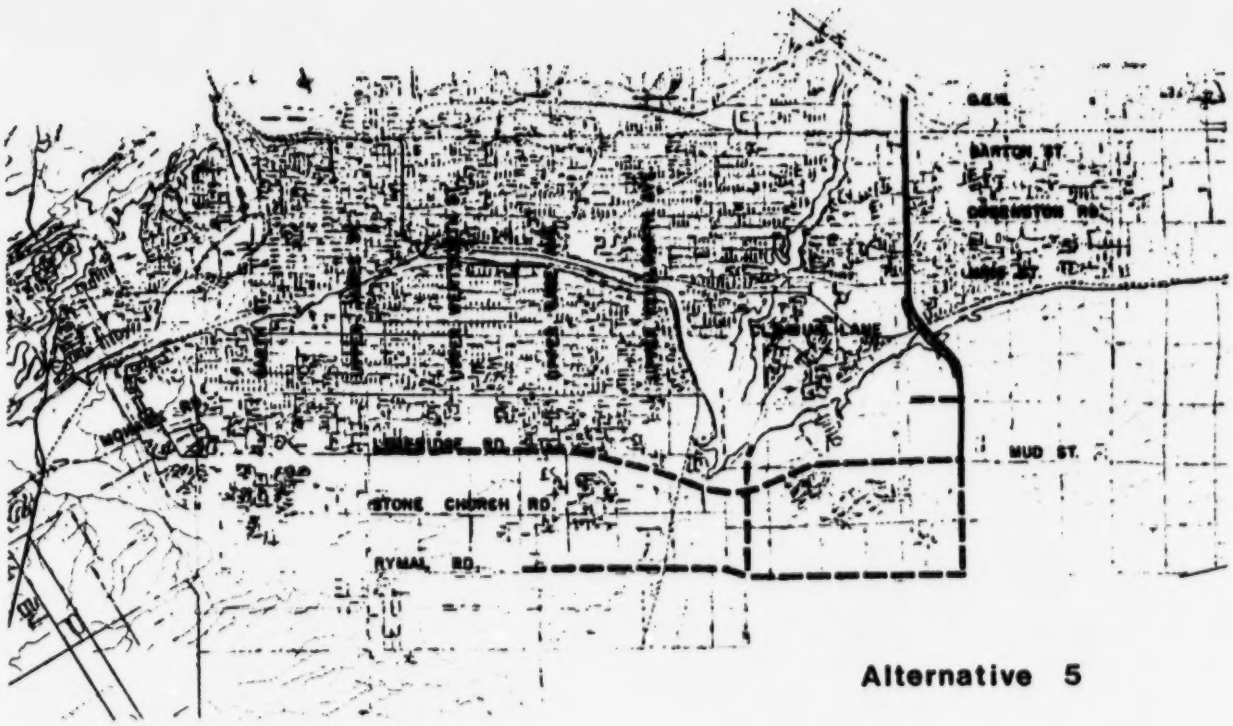


Alternative 8

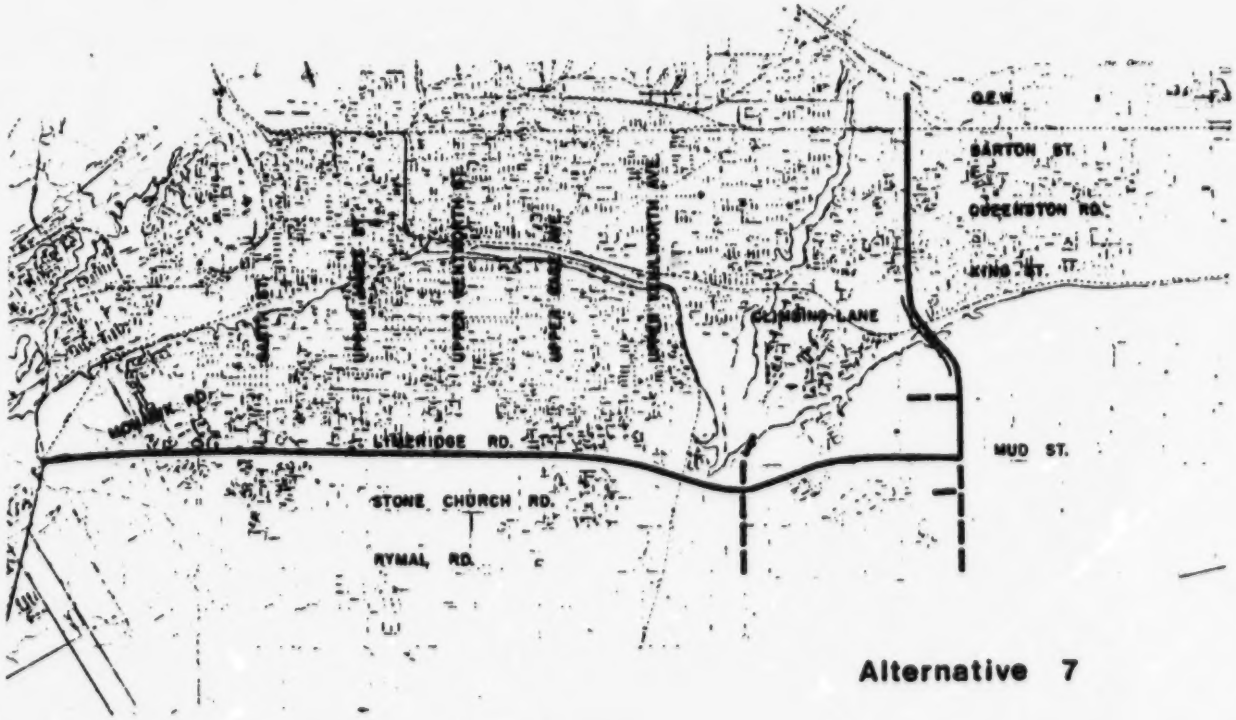
MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

MAJOR ROADWAY ALTERNATIVES

ALTERNATIVES 5, 6, 7, 8



Alternative 5



Alternative 7

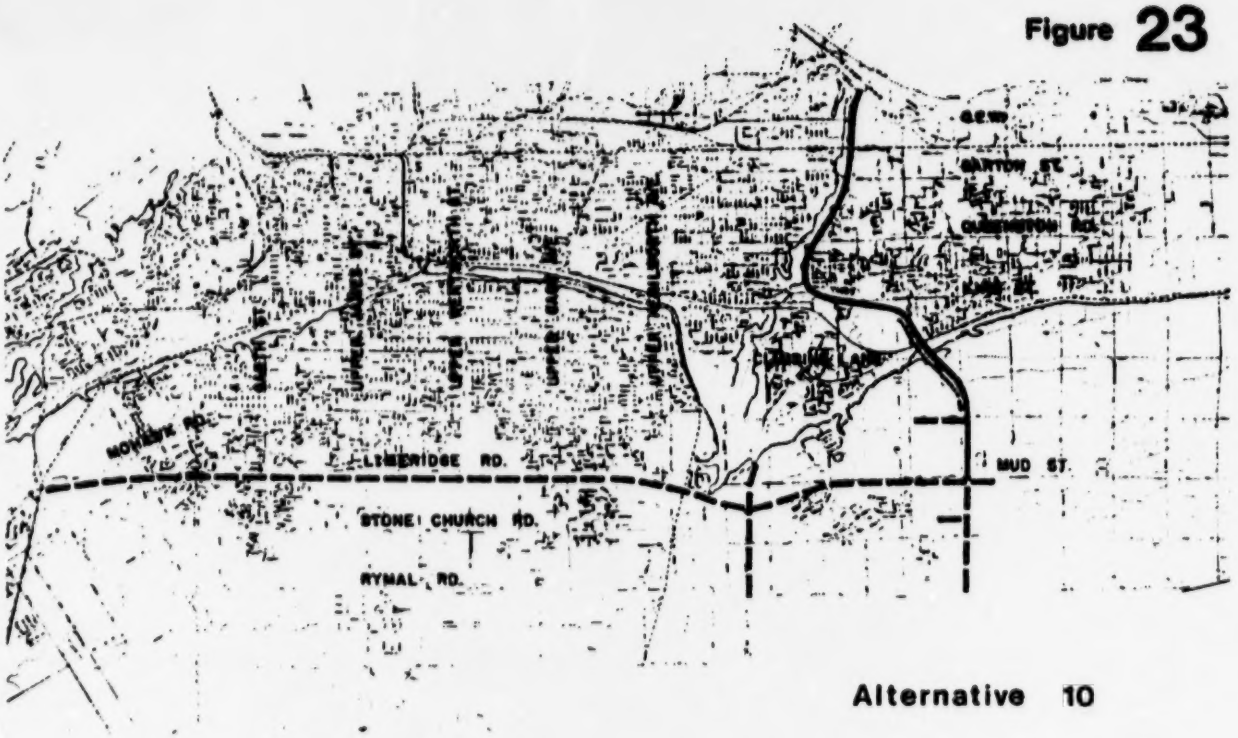
LEGEND:

FREEWAY FACILITY

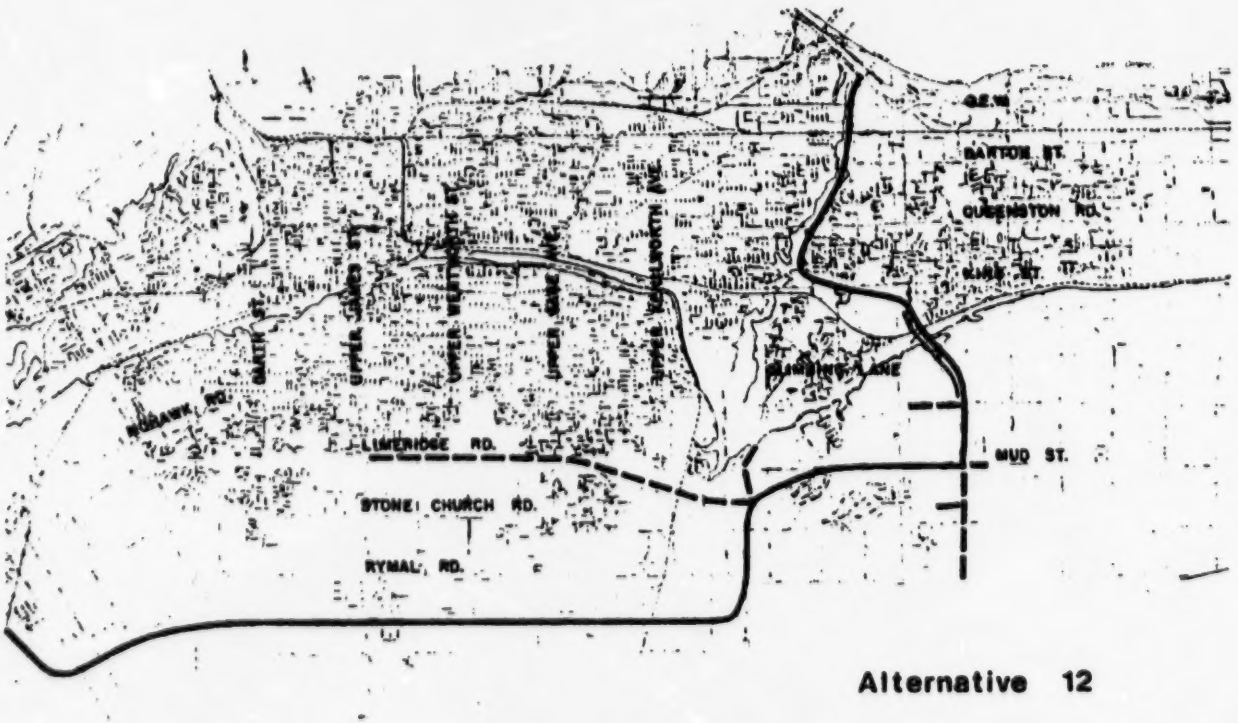
ARTERIAL ROAD

DeLCan

Figure 23



Alternative 10

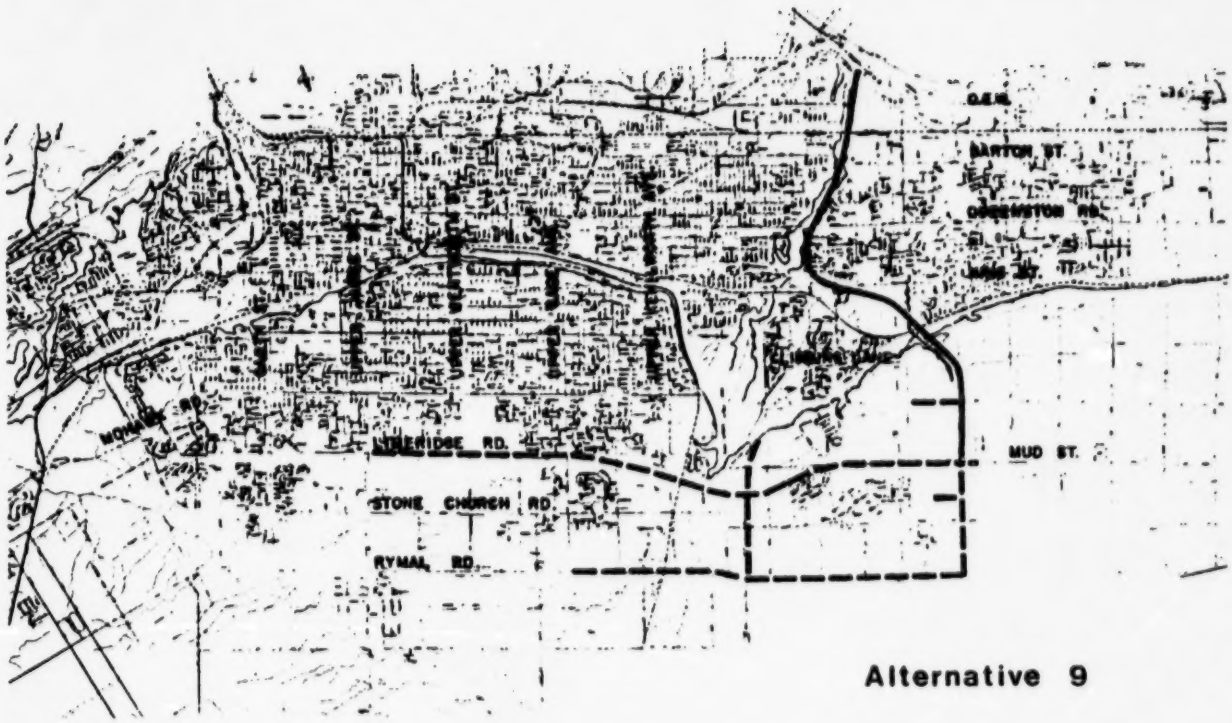


Alternative 12

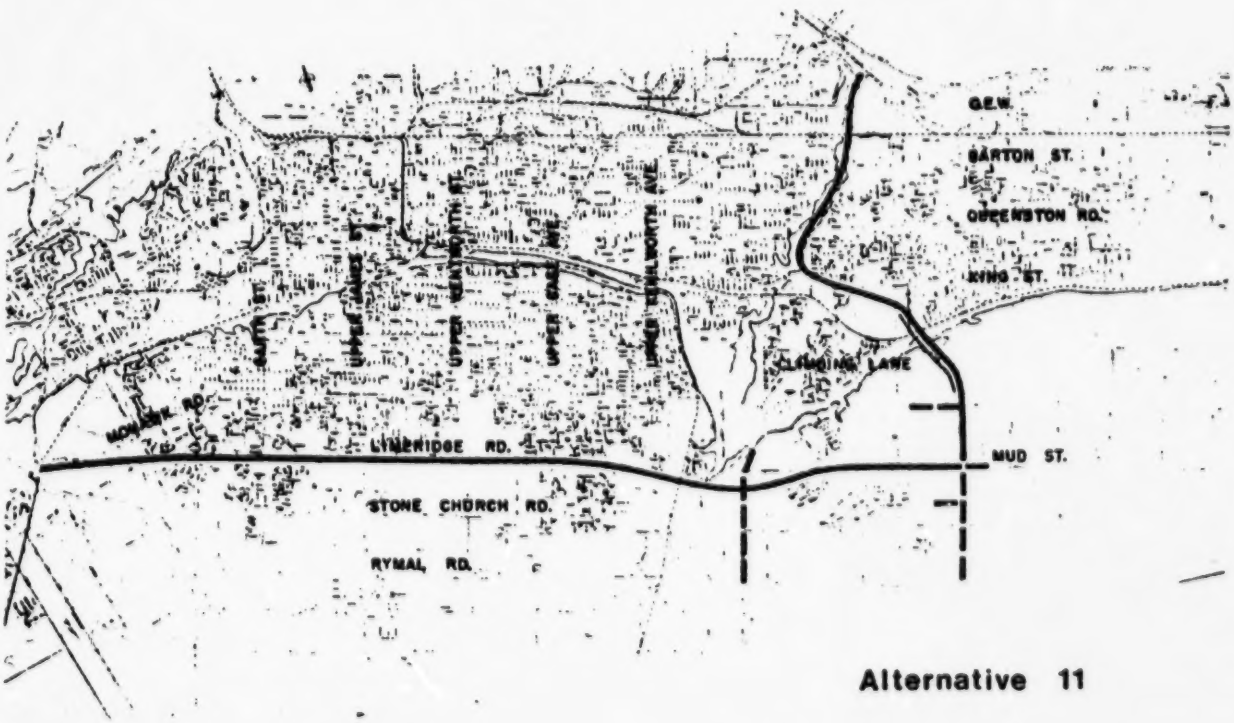
MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

MAJOR ROADWAY ALTERNATIVES

ALTERNATIVES; 9, 10, 11, 12



Alternative 9



Alternative 11

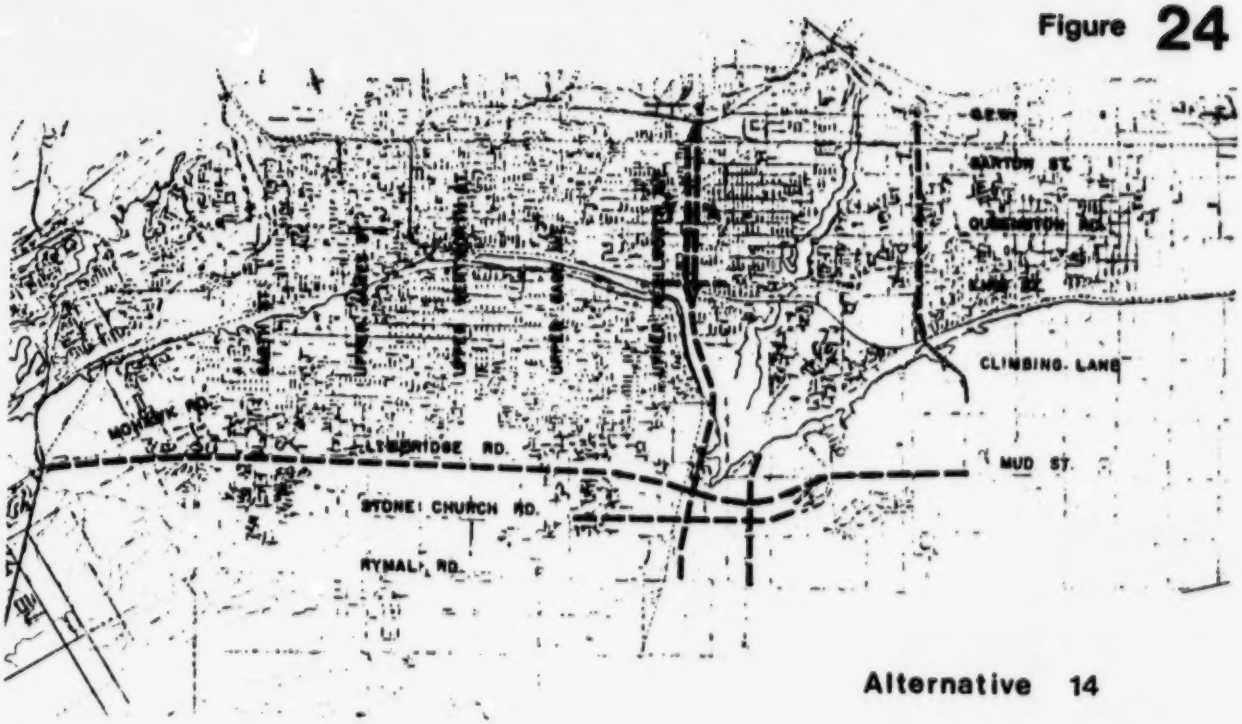
LEGEND:

FREEWAY FACILITY

ARTERIAL ROAD

DeLCan

Figure 24

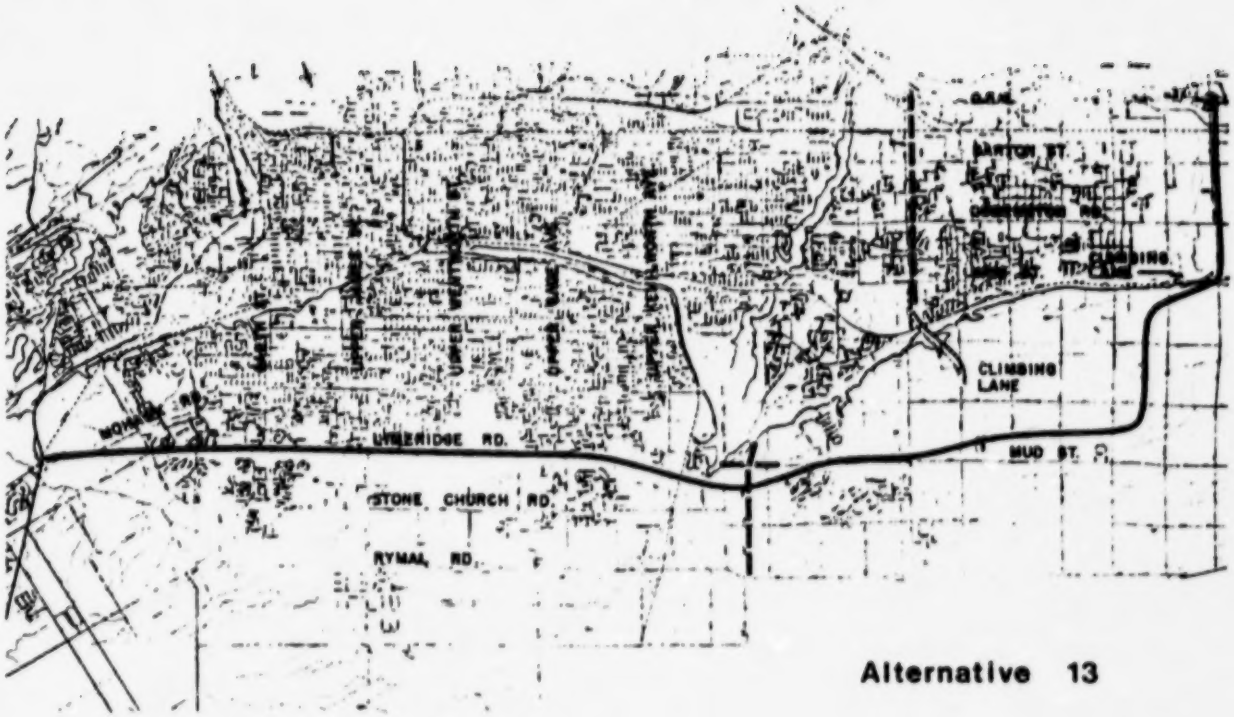


Alternative 14

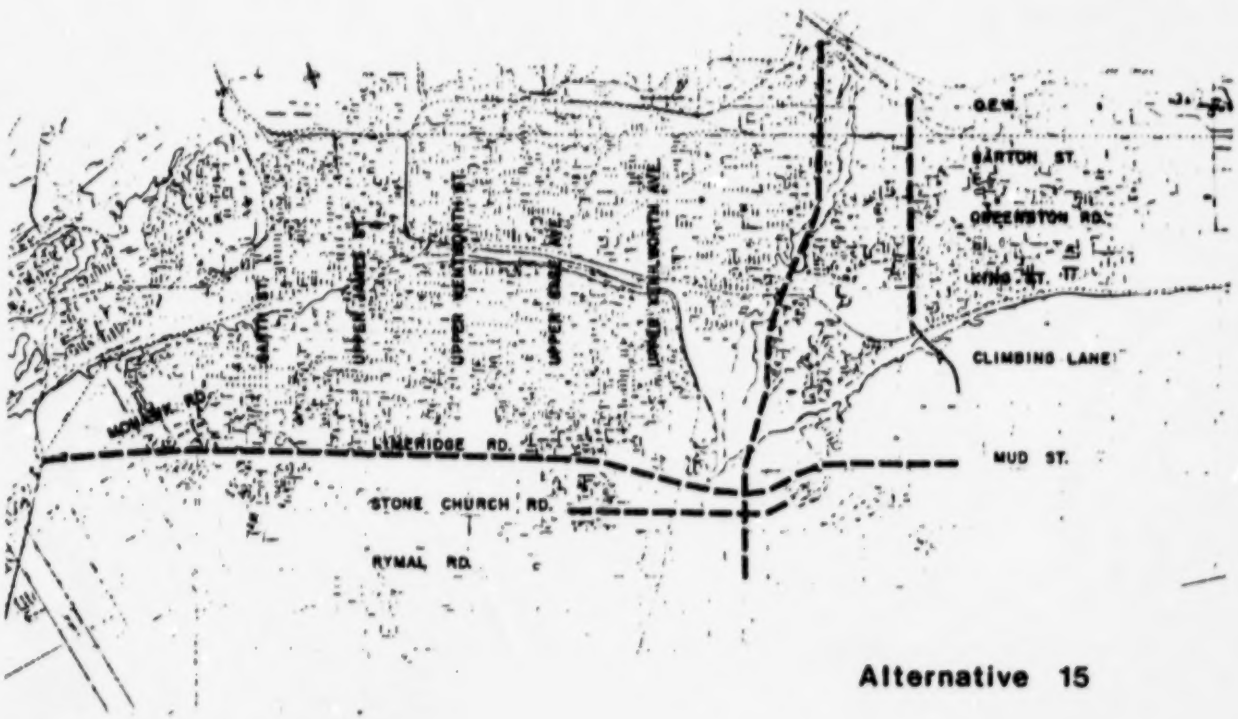
MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

MAJOR ROADWAY ALTERNATIVES

ALTERNATIVES; 13, 14, 15



Alternative 13



Alternative 15

LEGEND:

FREEWAY FACILITY

ARTERIAL ROAD

APPENDIX B

OVERVIEW OF THE PROCESS OF ELIMINATION OF ALTERNATIVES/CRITERIA

OVERVIEW OF THE PROCESS OF ELIMINATION OF ALTERNATIVES/CRITERIA

PHASE 1 EXAMINE 3 ALTERNATIVE STRATEGIES:

No-Action Alternative

Minor Alternative

Major Alternatives

RATIONALE FOR DELETION:

"If development as outlined in the Official Plan is to be accommodated and current transportation deficiencies are to be resolved, construction of a new roadway facility [a Major Alternative] represents the most appropriate planning alternative... The NO-ACTION and MINOR alternatives did not represent viable alternatives to the undertaking." (p.5-16)

ASSESSMENT CRITERIA (SET A):

I. Impact on Social Environment
   a) Traffic nuisance in residential areas
   b) Homes required
   c) Safety of vehicular traffic
   d) Provision of upgraded truck route

II. Impact on Economic Environment
   a) Physical disruption of existing business
   b) Enhancement of designated development
   c) Effect on vehicle operating costs
   d) Capital cost of roadway construction

III. Impact on Natural Environment
   a) Potential conflict with environmental constraint areas

IV. Level of Accessibility
   a) Estimated 200 capacity deficiency

V. Compatibility with Adopted Transportation Policy

RESULT:

Strategies retained: Major Alternatives

Strategies deleted: No-Action and Minor Alternatives

PHASE 2 PRELIMINARY EVALUATION OF 15 MAJOR ALTERNATIVES:

Alternative No. 1 to Alternative No. 15

RATIONALE FOR DELETION:

"...to delete alternatives which, by virtue of their location and/or type, did not meet the basic objective of accommodating future travel demand, and in addition created significant disruption to people, the natural environment, and financial resources." (p.5-30)

ASSESSMENT CRITERIA (SET B):

A. Transportation Service
   a) Relief to arterial system
   b) Truck attractiveness
   c) Reliance on high transit use

B. Impact on Social Environment
   a) Homes required/affected
   b) Businesses required/affected
   c) Neighbourhood disruption
   d) Affected committed future developments

C. Impact on Natural Environment
   a) Effects on physical environment
   b) Effects on biological environment
   c) Effects on scenic resources

D. Impact on Recreation (Red Hill Creek Valley)
   a) Effected lands north of King Street
   b) Effected lands south of King Street
   c) Impact on future use
   d) Impact on established recreational facilities

E. Capital Cost

a) Construction cost

b) Property cost

F. Cost Effectiveness

RESULT:

Alternatives retained: No. 2, 3, 4, 10, 11 and 15

Alternatives deleted: No. 1, 5, 6, 7, 8, 9, 12, 13 and 14

PHASE 3 DETAILED IMPACT ASSESSMENT OF 6 MAJOR ALTERNATIVES:

Alternatives No. 2, 3, 4, 10, 11 and 15

RATIONALE FOR DELETION:

Alternative 14 deleted because other alternatives created "less severe impact on the environment with substantial capital cost savings". (p.5-48). Alternative 15 deleted because other alternatives produced greater "benefits in terms of increased accessibility, reduced community disruption, lower accident potential and transportation flexibility..." (p.5-48)

Four of the 17 criteria were excluded from evaluating the 6 alternatives since: "these factors did not assist in highlighting differences between the alternatives". (p.5-47)

ASSESSMENT CRITERIA (SET C):

Included:

1. Number of Homes to be Acquired
2. Noise
4. Regional Accessibility
5. Community Impact
6. Impact on Recreation
8. Number of Businesses to be Acquired
10. Development Potential
11. Natural Environment

12. Scenic Resources
13. Flexibility
14. Potential Rate of Accidents
15. Service to Truck Traffic
17. Cost

Deleted

3. Visual Intrusion
7. Air Quality
9. Property Tax Impact
16. Transit Service

RESULT:

Alternatives retained: No. 2, 3, 10 and 11

Alternatives deleted: No. 4 and 15

PHASE 4 PAIRED COMPARISON OF FREEWAY VS. ARTERIAL IN EAST WEST CORRIDOR:

Alternatives No. 2 vs. 3 and Alternatives No. 10 vs. 11

RATIONALE FOR DELETION:

Elimination of Alternative No. 3 and 11 because: "the Study Team did not feel that the benefits offered by a freeway facility in the east-west corridor compensate for the significant difference in construction costs". (p.5-51) Five of the remaining 13 criteria were excluded from evaluating the 4 alternatives since they "indicated little or no difference between the alternatives..." (p.5-50)

ASSESSMENT CRITERIA (SET C):

Included

1. Number of Homes to be Acquired
2. Noise
4. Regional Accessibility
10. Development Potential
13. Flexibility

14. Potential Rate of Accidents
15. Service to Truck Traffic
17. Cost

Deleted

5. Community Impact
6. Impact on Recreation
8. Number of Businesses to be Acquired
11. Natural Environment
12. Scenic Resources

RESULT:

Alternatives retained: No. 2 and 10

Alternatives deleted: No. 3 and 11

PHASE 5 FINAL EVALUATION OF 2 MAJOR ALTERNATIVES IN THE NORTH-SOUTH CORRIDOR BETWEEN MOUNT ALBION ROAD AND KING STREET EAST:

Alternative No. 2 vs. Alternative No. 10

RATIONALE FOR DELETION:

Elimination of Alternative No. 10 because the Study Team believed that Alternative No. 2 "was the least disruptive to the community and provided the best opportunity to achieve the desired objectives for growth and development in the Region". (p.5-57) Three of the remaining 8 criteria were excluded from evaluating of 2 final alternatives since they "indicate small or insignificant differences..." (p.5-52)

ASSESSMENT CRITERIA (SET C AND D):

Included

1. Number of Homes to be Acquired
4. Regional Accessibility
10. Development Potential
13. Flexibility
17. Cost

Re-included

6. Impact on Recreation
8. Number of Businesses to be Acquired
11. Natural Environment
12. Scenic Resources

Also Added (Set D)

a) Increase in Traffic on Adjacent Streets Above Current Level
b) Reduction in Through Traffic
c) Expansion Capability
d) Flexibility
e) Facility User Costs
f) Potential for Successful Mitigating Measures

Deleted

2. Noise
14. Potential Rate of Accidents
15. Service to Truck Traffic

RESULT:

Alternative recommended/preferred: No. 2

Alternative deleted: No. 10

"As a result of the in-depth assessment of the viable alternatives, the Study Team recommended Alternative 2 be selected for detailing in Phase 4 [of the project as the Preferred Alternative] ". (p.6-1)

APPENDIX C

PUBLIC PARTICIPATION QUESTIONNAIRE

questionnaire

A major roadway project may create significant changes in the surrounding development. Experience indicates the following list of considerations are of repeated concern in new roadway planning. However, you may not consider the list complete. Please add others as necessary.

Examine the list closely, including those you may have added. Assign points to each of the statements depending on your opinion of its relative importance. Be sure that the sum of the points assigned equals 100. The more points given to a particular statement indicates a greater importance or priority.

		Points
1	Reduce travel time to work, shopping and recreation area	
2	Reduce through auto and truck traffic within residential areas	
3	Minimize relocation of families in building new roadways	
4	Preserve open space and natural recreation areas	
5	Minimize impact on your property taxes	
6	Encourage orderly growth and development within your community	
7	Promote expansion and improvement of public bus services	
8		
9		
	Total	100

Name _____

Address _____

Additional Comments: _____

If you wish to forward additional comments or suggestions, send to:

REGIONAL ENGINEERING DEPARTMENT,
City Hall,
Attention Corridor Study,
71 Main St. W., HAMILTON, Ont., L8N 3T4

study schedule

march, 1978

future road needs

we are here

june, 1978

preliminary alternatives

september, 1978

evaluation of viable alternatives

january, 1979

selection and staging of preferred option

what will be considered in the evaluation of alternatives?

The type, size and location of a roadway create both positive and negative impacts on people, the physical environment and the natural environment. Information on the transportation aspects of the alternative is the major aspect of measuring the effects of its construction.

The relationship between the transportation factors and the effects on people, places and the natural environment is summarized below:

RELATIONSHIP OF TRANSPORTATION FACTORS BY IMPACT CATEGORY

Impact Categories	Size & Location of Road	Road Maintenance Methods	Mix of Auto & Truck Traffic	Magnitudes & Orientation of Traffic	Degree of Access
Social Impacts					
•People and Property	x				
•Noise	x		x		
•Visual Intrusion	x		x		
•Travel Time	x		x	x	x
•Cultural, Historic and Recreational Areas	x				
Economic Impacts					
•Business Activity	x		x		x
•Property Taxes	x				x
•Future Growth	x			x	x
Environmental Impacts					
•Wildlife	x	x	x		
•Vegetation	x	x	x		
•Air Quality	x		x		
Engineering					
•Cost	x	x			x
•Effect on Road and Transit System	x			x	x

REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH

mountain east·west/ north·south corridor study

Highway 403 to the Q.E.W.

public information centres

2 p.m. to 9 p.m.

monday, july 10
cardinal newman high school - 33 cromwell cr.

tuesday, july 11
hill park school
465 east 16th street

WHAT DO YOU THINK?

MOUNTAIN EAST - WEST AND NORTH - SOUTH CORRIDOR STUDY

IN REVIEWING THE SUMMARY OF THE IMPACT ASSESSMENT,

- DO YOU BELIEVE THE 16 FACTORS LISTED ON PAGES 8 AND 9 PROVIDE SUFFICIENT INFORMATION TO MAKE A DECISION? YES ☐ NO ☐

- IF NO, WHAT ADDITIONAL FACTORS DO YOU BELIEVE SHOULD BE ADDED?

1. _____
2. _____
3. _____
4. _____
5. _____

- IN GENERAL, OF THE 6 ALTERNATIVES SHOWN IN THE EXHIBITS, WHICH DO YOU PREFER?

FIRST CHOICE: ALTERNATIVE ___
SECOND CHOICE: ALTERNATIVE ___
THIRD CHOICE: ALTERNATIVE ___

- ARE THERE ANY MODIFICATIONS WHICH WOULD MAKE YOUR FIRST CHOICE MORE ACCEPTABLE?

_____
_____
_____

- IN REACHING YOUR DECISION, WHICH WERE THE THREE MOST IMPORTANT FACTORS TO YOU OF THE 16 FACTORS LISTED ON PAGES 8 AND 9?

FIRST MOST IMPORTANT: FACTOR NO. ___
SECOND MOST IMPORTANT: FACTOR NO. ___
THIRD MOST IMPORTANT: FACTOR NO. ___

OTHER COMMENTS _____
_____
_____

NAME OF YOUR COMMUNITY OR AREA:
NUMBER OF YOUR AREA: (SEE REVERSE SIDE FOR MAP OF AREA NUMBER DESIGNATION)

MAIL TO: REGIONAL ENGINEERING DEPARTMENT
CITY HALL
ATTENTION: CORRIDOR STUDY
71 MAIN ST. W., HAMILTON, ONT., L8N 3T4

IF YOU WISH TO BE ADDED TO OUR MAILING LIST:

NAME: ADDRESS:
POSTAL CODE:

Tear Along Dotted Line

MOUNTAIN EAST - WEST AND NORTH - SOUTH CORRIDOR STUDY

PHASE 4: DETAILING OF PREFERRED OPTION

PUBLIC INFORMATION CENTRE QUESTIONNAIRE

MONDAY, JUNE 23	☐	ROXBOROUGH PARK SCHOOL
TUESDAY, JUNE 24	☐	ALBION PUBLIC SCHOOL
WEDNESDAY, JUNE 25	☐	MOUNT ALBION SCHOOL
THURSDAY, JUNE 26	☐	HILL PARK SECONDARY SCHOOL

1. DURING THE DETAILED PLANNING OF THE SELECTED ROADWAY ALTERNATIVE, EFFORTS HAVE BEEN MADE TO MINIMIZE THE IMPACT OF THE ROADWAY ON THE ABUTTING RESIDENTIAL, COMMERCIAL, AND OPEN SPACE DEVELOPMENT. DO YOU HAVE ANY COMMENTS REGARDING THE PROPOSAL?

_____

_____

_____

_____

_____

2. IN MAKING THESE SUGGESTIONS, WHICH OF THE FOLLOWING ISSUES WERE MOST IMPORTANT TO YOU?

ACCESS TO YOUR HOME AND WORK	☐
PROPERTY REQUIREMENTS	☐
TRAFFIC NOISE	☐
VISUAL APPEARANCE	☐
PEDESTRIAN CIRCULATION	☐
EFFECT ON POTENTIAL RECREATIONAL LAND	☐
PROXIMITY TO SCHOOLS	☐
EFFECT ON VEGETATION AND WILDLIFE	☐
OTHER (PLEASE DESCRIBE)	☐

_____

3. THE RECREATIONAL MASTER PLAN HAS OUTLINED THE POSSIBLE RECREATIONAL DEVELOPMENT WITHIN THE RED HILL CREEK VALLEY COMPATIBLE WITH THE CONSTRUCTION OF A ROADWAY. DO YOU CONSIDER THE PROPOSED PLAN TO BE GENERALLY:

GOOD	☐
ACCEPTABLE	☐
UNACCEPTABLE	☐

HOW COULD IT BE IMPROVED?

_____

_____

_____

_____

4. WHAT ISSUES DO YOU FEEL SHOULD BE INVESTIGATED FURTHER?

_____

_____

_____

_____

5. OTHER COMMENTS:

_____

_____

_____

PLEASE LEAVE YOUR COMPLETED QUESTIONNAIRE WITH THE PROJECT STAFF BEFORE LEAVING THE INFORMATION CENTRE OR MAIL TO:

REGIONAL ENGINEERING DEPARTMENT,
CITY HALL,
ATTENTION: CORRIDOR STUDY,
71 MAIN STREET WEST, HAMILTON, ONTARIO, L8N 3T4.

APPENDIX D

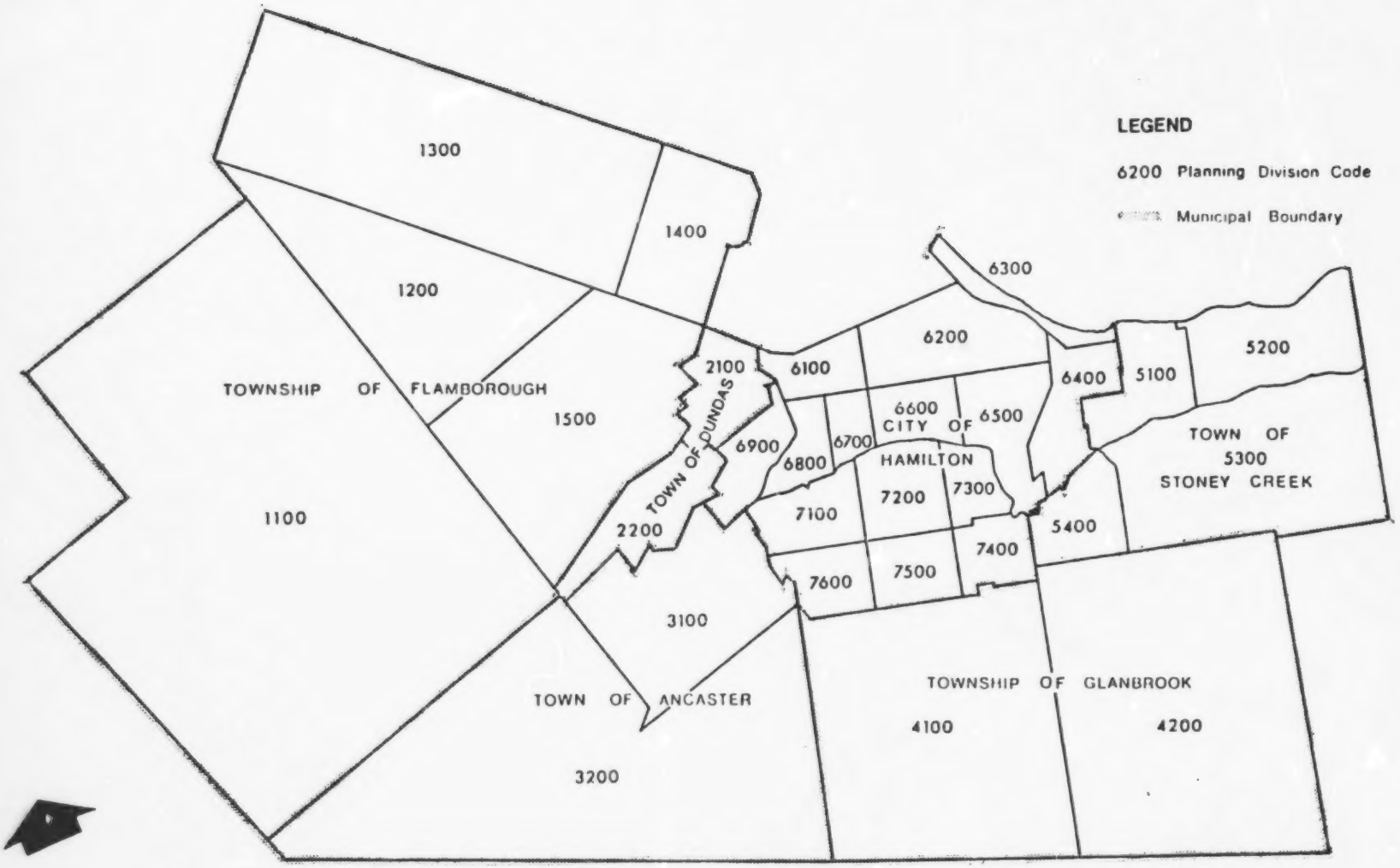
REGIONAL POPULATION AND DWELLING PROJECTIONS

REGIONAL POPULATION AND DWELLING PROJECTIONS

Planning Division	Existing Dwellings x Person Per Dwelling Unit Rate	1980 Population Estimate	2001 Projected Number of Dwellings x p.p.d.u. Rate	2001 Population Estimate	Population Change (1980 to 200
6100	1,832 x 3.1	5,679	1,750 x 2.8	4,900	- 799
6200	2,488 x 3.2	7,962	1,500 x 2.8	4,200	- 3,762
6300	1,462 x 2.9	1,592	0 x 0.0	0	- 1,592
6400	11,674 x 2.9	33,855	12,500 x 2.5	31,250	- 2,605
6500	15,194 x 2.7	41,024	14,800 x 2.3	34,040	- 6,984
6600	16,812 x 2.6	43,711	16,900 x 2.2	37,180	- 6,531
6700	14,340 x 1.8	25,812	18,900 x 1.5	28,350	+ 2,538
6800	6,581 x 2.6	17,111	6,900 x 2.1	14,490	- 2,621
6900	7,515 x 2.5	18,788	7,800 x 2.1	16,380	- 2,408
Lower City Sub-Total	76,985 x 2.5	195,534	81,050 x 2.1	170,790	- 24,744
7100	8,900 x 3.2	28,480	10,000 x 2.5	25,000	- 3,480
7200	15,628 x 2.7	42,196	18,200 x 2.5	45,500	+ 3,304
7300	7,548 x 3.0	22,644	9,800 x 2.4	23,520	+ 876
7400	1,439 x 3.6	5,180	2,600 x 2.9	7,540	+ 2,360
7500	881 x 3.2	2,819	5,900 x 2.9	17,110	+ 14,291
7600	2,563 x 3.6	9,227	4,300 x 2.9	12,470	+ 3,243
Mountain Sub-Total	36,959 x 3.0	110,546	50,800 x 2.6	131,140	+ 20,594
Hamilton Total	113,944 x 2.7	306,080	131,850 x 2.3	301,930	- 4,150
5400	1,558 x 3.5	5,453	5,162 x 3.1	16,002	+ 10,549
Grand Total	115,502 x 2.7	311,533	137,012 x 2.3	317,932	+ 6,399
Mountain + 5400	38,517 x 3.0	115,999	55,962 x 2.6	147,142	+ 31,143
7400 to 7600 + 5400	6,441 x 3.5	22,679	17,962 x 3.0	53,122	+ 30,443

APPENDIX E

REGIONAL PLANNING DIVISION MAP



REGIONAL PLANNING DIVISION MAP

APPENDIX F

PLANNING DIVISIONS 6500 AND 6600: POPULATION AND DWELLING PROJECTIONS

PLANNING DIVISIONS 6500 AND 6600: POPULATION AND DWELLING PROJECTIONS

	Planning Division	1956	1961	1966	1971	1976	1981	2001
Population	6500	48,243	48,875	48,602	49,805	44,365	41,132	34,040
	6600	58,651	57,281	57,514	55,170	46,952	43,783	37,180
	Hamilton	239,625	273,991	298,121	309,175	312,003	306,434	301,930
Dwellings	6500	12,674	12,843	13,986	14,725	15,255	15,195	14,800
	6600	16,723	16,160	16,779	17,075	16,430	16,715	16,900
	Hamilton	63,815	73,829	84,540	94,595	108,751	113,875	131,850
Persons Per Dwelling Unit	6500	3.8	3.8	3.5	3.3	2.9	2.7	2.3
	6600	3.5	3.5	3.4	3.2	2.9	2.6	2.2
	Hamilton	3.7	3.6	3.5	3.2	2.9	2.6	2.3
Number of Families	6500	13,068	12,932	12,883	12,295	12,360	11,755	**
	6600	15,703	14,743	14,043	13,420	11,825	10,690	**
	Hamilton	62,329	68,791	73,374	77,570	80,780*	81,890	**
1-Person Households	6500	430	784	1,176	1,620	2,470	3,090	**
	6600	1,469	2,024	2,573	2,950	4,050	5,315	**
	Hamilton	4,350	6,682	10,047	18,400	22,020	28,870	**
Household by Number of Families: 0 (zero)	6500	698	1,194	1,654	2,225	3,055	3,600	**
	6600	2,559	3,076	3,692	4,385	5,110	6,250	**
	Hamilton	7,239	9,939	14,020	24,560	29,150	33,265	**

* Estimate using Hamilton CMA data (for Hamilton-Wentworth, City of Burlington and Town of Grimsby).
**See Appendix G for estimates as they were not calculated in the Region's forecasts.

APPENDIX G

PROJECTION OF HOUSEHOLDS FOR 2001

PROJECTION OF HOUSEHOLDS FOR 2001

The Region made no estimates for the following for the year 2001:

1) number of families

2) 1-person households

3) households by number of families = 0

Thus, methods of estimation were employed in attempting to obtain an approximation for the above three variables. The methods utilized were:

1) linear extrapolation

2) method of least squares

3) measures of change in population*

The third measure gave a low value while the method of least squares produced a high estimate. Extrapolation was used simply as a market to determine a value if linear growth occurred. Most extrapolations fell between the two other values. Following, then, are the values obtained:

cont'd.../G-2

*From Jack P. Gibbs, "Population Growth and Composition" in Urban Research Methods, 1961.

		1981	2001		
	Planning Division		Measure of Change in Population	Linear Extra-polation	Method of Least Squares
Number of families	6500	11,755	10,851	10,880	10,900
	6600	10,690	9,868	8,900	7,044
	Hamilton	81,890	77,120	86,500	99,745
One person households	6500	3,090	3,777	5,100	5,087
	6600	5,315	6,496	7,080	7,834
	Hamilton	28,870	35,386	45,250	47,919
Household by number of families: 0	6500	3,600	4,400	5,800	5,909
	6600	6,250	7,639	8,350	8,868
	Hamilton	33,265	40,655	51,000	56,523